Rock Products

and

CEMENT and ENGINEERING NEWS (Est. 1896)

THE OLDEST PUBLICATION IN ITS FIELD AND THE RECOGNIZED AUTHORITY

Even Business Can Subscribe to This "Share the Wealth" Program!

THE AWARD of the contract for 4,220,000 bbl. of cement for the construction of the Grand Coulee dam in Washington State will give jobs to nearly 1200 men in the six Washington cement plants which participate in the order, and will mean a payroll at the cement factories alone of over $2,000,000 in the period of the contract.

Railroads of the state will enjoy revenue on coal, gypsum and other supplies necessary to make the cement, and on the finished product hauled to Odair, of nearly $4,000,000.

To make the cement will take 285,000 tons of coal. Coal mines of the state will give work to nearly 250 men for the next two years to supply this coal, at a payroll of nearly $800,000.

The cement plants will use in making the cement 84,000,000 kilowatt hours of electricity, enough to provide electricity for a city of 325,000 people for a year.

The manufacture of cement is a process that wears out heavy machinery. Nearly $525,000 will be spent for repair parts and replacements in supplying this cement. In addition to this 25,000 tons of gypsum and 870,000 pounds of heavy explosives will be required in the manufacturing process.

Operations have already started at the six cement factories and hundreds of Washington families will once more enjoy the prospect of steady employment.

—The Editor.

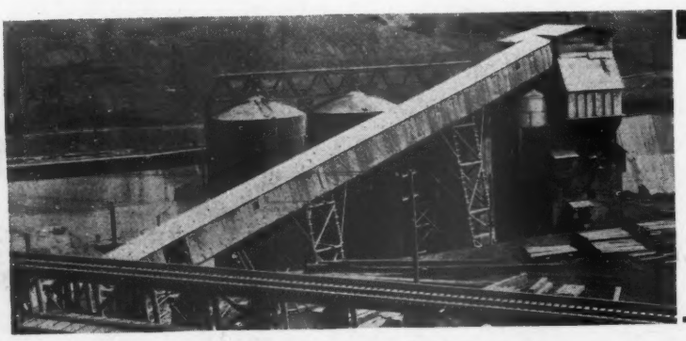
"HERE, SIR, IS A NEW COMPLETE CATALOG on . .

Within the covers of this New Jeffrey Catalog No. 610 you will find a concentration of data amassed over a period of 57 years. It is a unique authority on the application of Belt Conveyors.

Just a few minutes leafing through this Catalog will convince the most skeptical that it contains valuable data presented accurately and concisely for the convenience of even the busiest engineer. You can readily select a conveyor to meet your particular requirement . . . and order it by its number.

This new Catalog No. 610 should occupy a place in your files as a complete reference book on the subject of Belt Conveyors.

Send for your copy today



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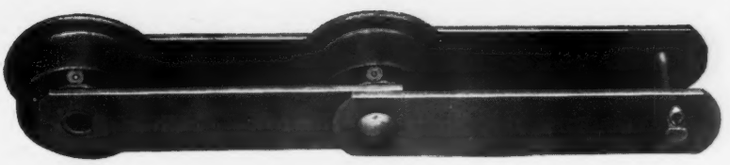
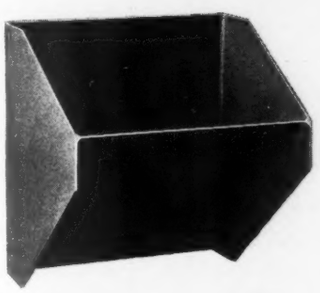
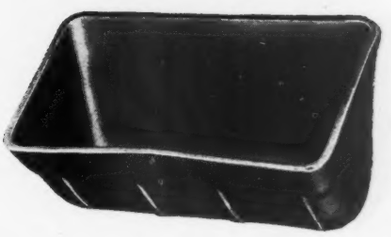
BUCKETS
for
MATERIALS HANDLING







Made of PROMAL - MALLEABLE IRON - STEEL

FOR smooth operation and long life with maintained efficiency—for real economy in the severest conveying and elevating service, use this wear-resisting combination.

Investigate Promal, the stronger, longer-wearing metal for chains and buckets. It lasts several times as long as malleable iron and costs but little more. Send for catalog.

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The Leading Manufacturer of Equipment for Handling Materials and Transmitting Power

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Rock Products

With which is Incorporated **CEMENT and ENGINEERING NEWS** Founded 1896

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(Published Monthly—Except January, Semi-Monthly)

October, 1935

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the all purpose dipper!

1.
Tooth bases are cast integral with lip (no expense for renewing bases).

2..
Note the dovetail joint! Lips are quickly and easily changed by loosening two U-bolts and removing four wedges.

3...
The U-bolt fastening between lip and back supplements and reinforces the dovetail joint between lip and front.

4....
Back lugs can be arranged to fit any type of dipper stick. Dippers are made either with bail or without as required.

5.....
A renewable Manganese Steel wearing band compensates for wear at the dipper heel.

6.....
Furnished with double wall lip and teeth for hard digging and rock handling; single wall cutter type lip and teeth for rehandling, stock piling and loose material digging; and a thin, serrated edge, cutter type lip for mucking, clay digging, etc.

U. S. Patent No. 1,945,064

The AMSCO Renewable Lip All-Manganese Steel Dipper cuts digging costs. It consists of a one-piece cast manganese steel body available with easily renewable or interchangeable lips. Any type of lip can be supplied that is best adapted to digging conditions.

Lips are quickly and easily changed in the field—no trouble—no delay. Knock out four keys, loosen two U-bolts and the lip is off. No rivets to punch out or renew.

Get maximum efficiency and greater yardage from your shovels—equip them with AMSCO All-Manganese Steel Renewable Lip Dippers.

Your shovel manufacturer or our nearest office will gladly furnish complete details on these new AMSCO Renewable Lip Dippers which are made for all shovels in sizes from ¾ yard up and without separate lips in ⅜, ½ and ⅝ yard sizes. Write for the facts today.

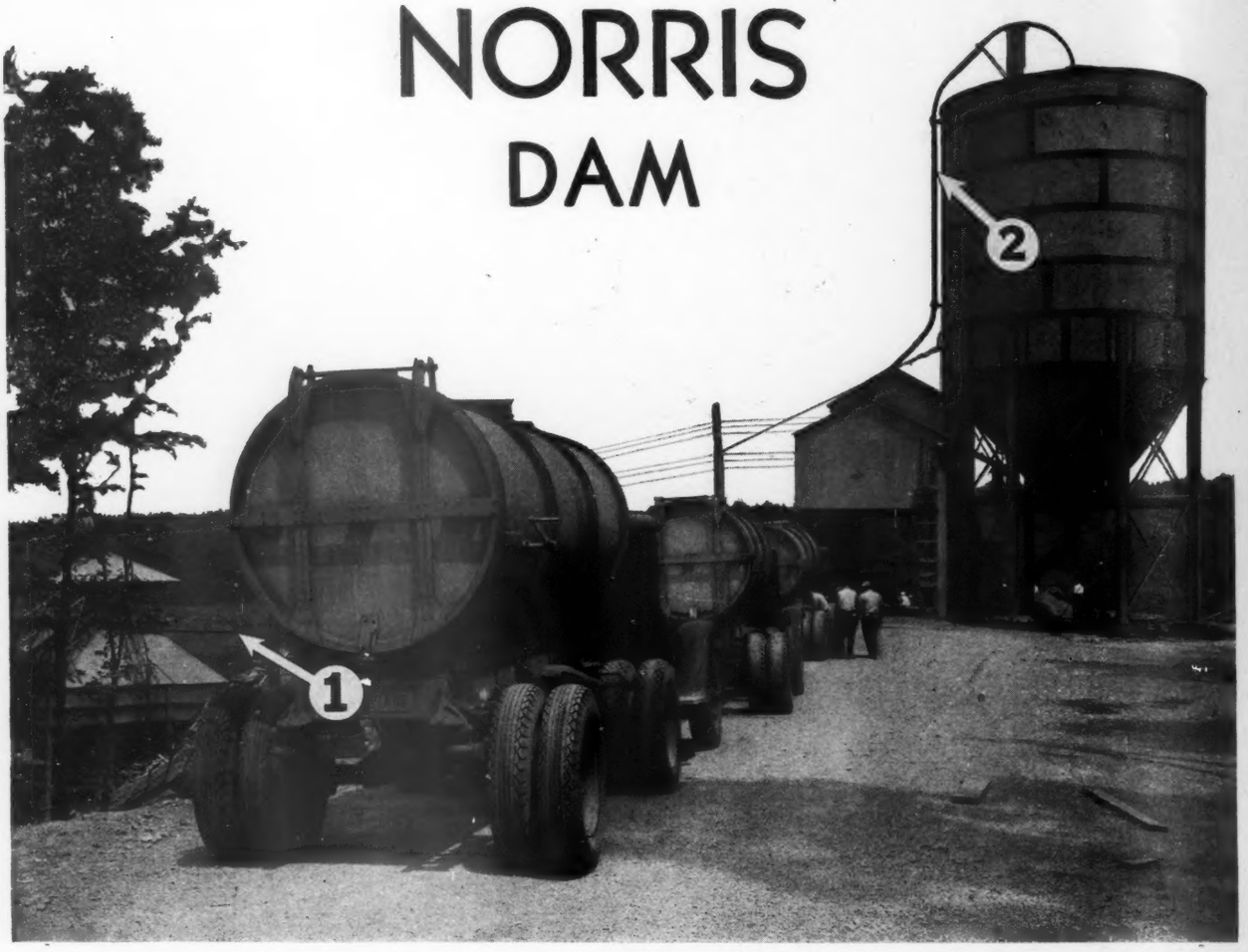
AMERICAN MANGANESE STEEL COMPANY

377 East 14th Street, Chicago Heights, Ill.

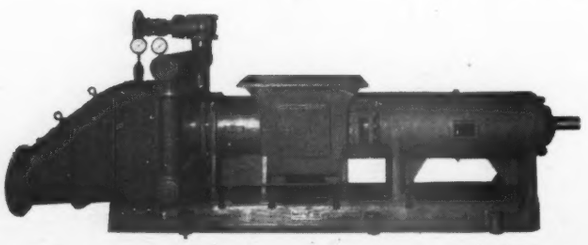
Division of American Brake Shoe and Foundry Co.

AMSCO

HANDLING THE CEMENT FOR NORRIS DAM



Two portable and two stationary Fuller-Kinyon Pumps are handling the cement for Norris Dam. At the railroad siding, the portable pumps unload boxcars and deliver the cement to a truck-loading bin, the arrangement providing for the discharge of four cars without shifting. Special trucks carry the cement a distance of five miles to the mixing plant where the loads are dumped into a hopper above two stationary pumps, of the type shown below. One pump is for stand-by service. From the hopper the cement is pumped either directly to the mixing plant through a pipe-line (1) suspended from a cable, or to storage in the bin illustrated, through branch line (2). Stored cement is spouted to the same hopper.



The stationary Type "H" Fuller-Kinyon Pump is the most economical and convenient conveyor for transporting cement from hopper-bottom cars, truck hoppers and storage bins. It will convey and elevate cement far beyond the practical limits of mechanical systems. Fuller-Kinyon Pumps are standard conveying practice in the cement industry.

Our bulletin shows how advantage has been taken of the flexibility in layout of Fuller-Kinyon Systems in all classes of mixing and batching plants. Write for copy.

Fuller Company
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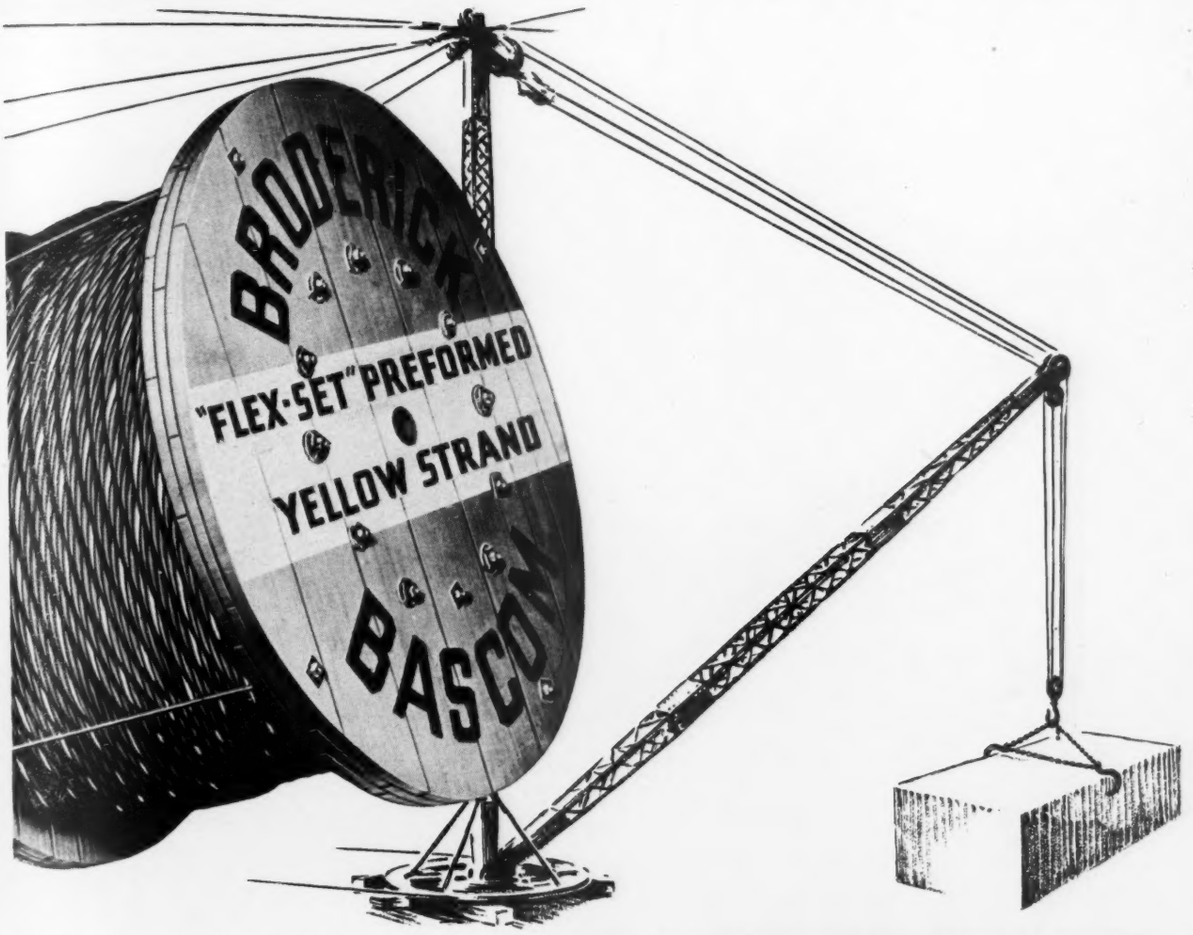
STATIONARY and PORTABLE **FULLER-KINYON** ***CONVEYING SYSTEMS***



Answering 2 "WHYS"

1ST: WHY is the wire in "Flex-Set" Preformed Yellow Strand of such high quality? Because our specifications are very high—the result of 59 years' experience making nothing but wire rope. Our "tolerances" are very narrow. Wire that does not "measure up", when tested in our laboratory, is discarded. After testing, those wires are selected for each rope that will produce the best balance of elasticity, flexibility, toughness, and tensile strength.

2ND: WHY is preforming desirable? Preforming shapes the strands to the helical form they will occupy permanently in the finished rope. Result: a limber rope that is practically pre-broken in—a rope that handles easily and installs easily; a rope that is less subject to fatigue and kinking; a rope that lasts longer, and saves money from start to finish.

"Flex-Set" Preformed Yellow Strand will prove all this to you, if you will give it a chance on your equipment. Order today—and begin to reap the benefit right away.

BRODERICK & BASCOM ROPE CO., St. Louis, Mo.

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T-17

"Flex-Set" Preformed Yellow Strand Wire Rope

HERE is modern output capacity which makes it profitable to put your old timers on the shelf. This husky 5-yard 170-B has modern power and speed . . . and with these the sure, quick control which lets you use "all they've got." Note the heaped dipper . . . characteristic of every pass . . . and how easily slabs or extra large oversize can be set aside. Load for less with modern Bucyrus-Eries.

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from largest to smallest--- TRAYLOR GYRATORY CRUSHERS excel in endurance!

Photo shows 60" machine, thirty feet high, weighing one million pounds.

The Traylor lines of Gyratory and Reduction Crushers comprise thirty different sizes of machines ranging in capacity from several thousand tons per hour to 12" size, to 10 tons per hour to ¼". All of these have in common many exclusive patented features and all are built of such ruggedness of design and with such precision of manufacture that they keep on, year after year, returning many times the investment they represent.

For instance, to mention only one of hundreds of users' experiences that prove our assertion, we were recently advised by a good friend operating a Traylor Bulldog, that his machine, installed in 1928, had crushed nearly eight millions of tons of rock without removing the eccentric, and that when the eccentric was taken out last month "as a matter of routine", it was still in good shape.

From other good friends we learn of similar remarkable experiences with other parts of Traylor Gyratories, and several have asserted that the Traylor Original, Patented, Non-Chokable Bell Heads and Curved Concaves, used in our reduction crushers and applicable to any gyratory, are "the greatest improvement in crushers for twenty-five years".

Operators not familiar with Traylor Bulldog Gyratory Crushers and Traylor Types TZ, BH and TY Reduction Crushers owe it to themselves to investigate our claims, for he LOSES who doesn't USE Traylor. Ask our nearest office for Bulletins 3100, 2100 and 1111, TODAY!

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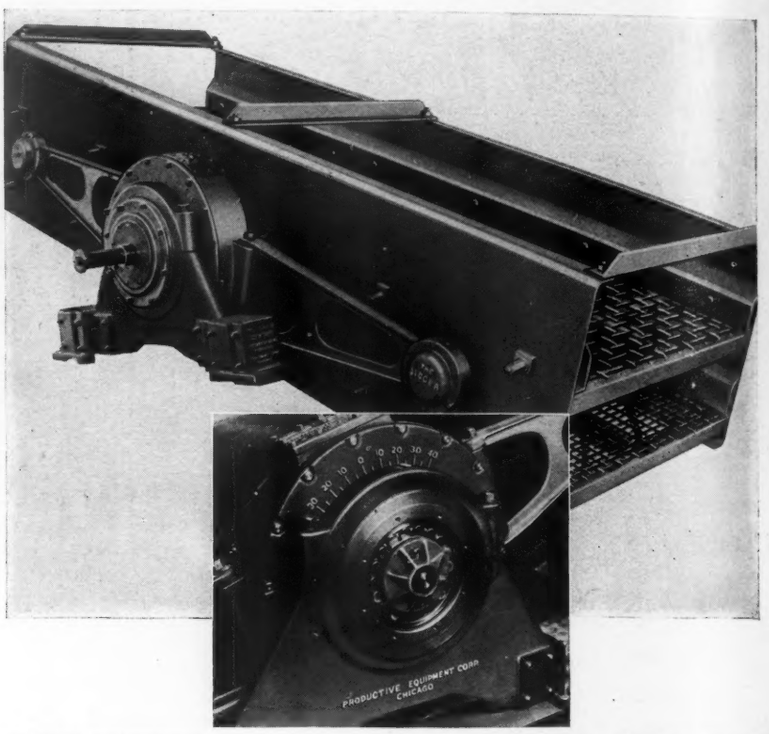
In Vibrating Screens

● SKF makes practically *all types of anti-friction bearings.* When SKF recommends a particular type of bearing, therefore, you may depend upon it; its recommendations are *unbiased!*



SKF-EQUIPPED **BUILT BY PRODUCTIVE EQUIP. CORP.**

It's no cinch for bearings that support this Selectro Screen, no easy place to work where smooth service is required in a dust-infected atmosphere. It's a tough task, as are all big jobs in the rock products field, a task for SKF.

Four SKF Spherical Roller Bearings make power pay profit to users of this product. They bring durability that leads to production from 325 mesh to 10″ opening with only one requirement: occasional lubrication. They're protected against lubricant leakage and dirt entrance, and they run season after season without showing wear. They're made to meet demands of hard jobs, and jobs that aren't so hard, wherever wheels turn.

SKF

BALL AND ROLLER BEARINGS 3466

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Scheduled to appear in the following publication, subject to change: Rock Products, 10-1-35

BUILT TO MAKE A PROFIT FOR THE LOW BIDDER!

This Austin-Western No. 100 mounted on rubber for fast transportation is, for its capacity, the most compact unit on the market. It has a 9" x 40" jaw crusher and a reduction roll crusher. (See illustrations below.)

● The advantage of genuinely low operating costs with Austin-Western Crushing, Screening and Washing Plants is two-fold: Not only are they the basis for bids which win contracts, but they carry through the job to yield the expected profit.

Low costs in producing aggregate are chiefly a matter of steady, efficient operation. Long practical experience with the stresses involved has been put to good use in the designs. Freedom from breakdowns reaches a high point in Austin-Western Equipment.

This construction is equally desirable to permanent plant operators or construction companies producing stone on or near the job.

Write, or send the coupon for details on equipment shown or other types.

The Austin-Western Road Machinery Co.
Home Office: Aurora, Illinois Cable Address: AWCO, Aurora
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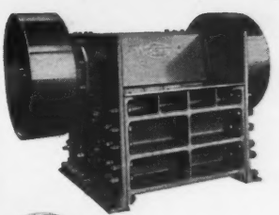
The 940 Primary Breaker will operate at full capacity without delay or trouble. Self-aligning roller bearings reduce friction, save on horsepower, and reduce lubrication costs.

The Austin-Western 3018 Roll Crusher uses 50 gasoline horsepower. Roller diameter (with 2" manganese shells) 30"—face 18". Roller speed 60 r.p.m.



A 940 Roller Bearing Crusher with power unit and 28-foot elevator mounted on high type truck. The exceptionally large jaw opening and depth of dies (25¾" and 22¼") insure unusually large capacity.

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The Austin-Western Road Machinery Co.
V, Aurora, Illinois
Please tell me more about your ☐ complete plants; ☐ washing and screening plants; ☐ jaw crushers; ☐ 3018 roll crusher.

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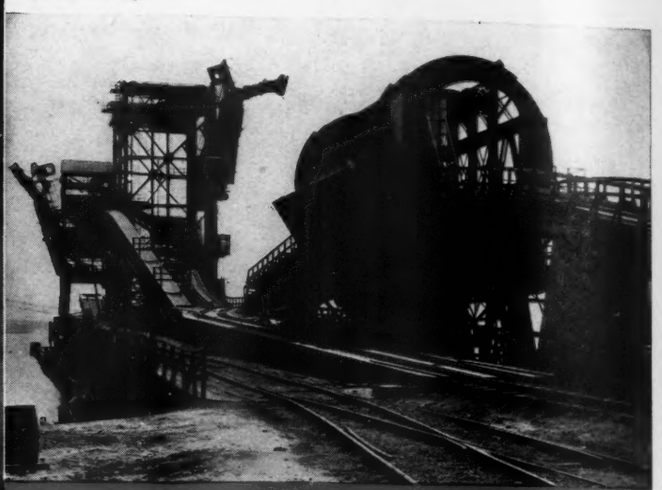
This Goodrich Belt has handled 650 tons of crushed ore daily for 10 years, and is still going strong.



Modern coal dock installation equipped with Goodrich Belt.

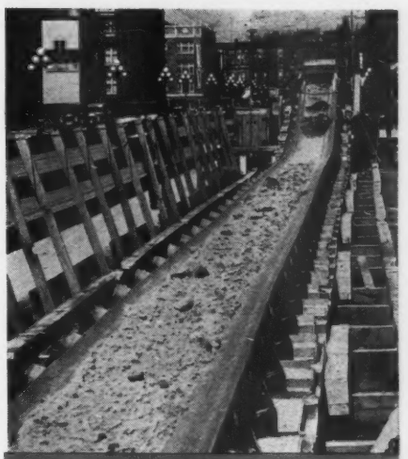
Showing the foldless edge and protective edge cushion of Goodrich Conveyor Belt.

GOODRICH MECHANICAL RUBBER GOODS FOR THE ROCK PRODUCTS INDUSTRY INCLUDE . .

- *Conveyor, Elevator and Transmission Belting*
- *Multiple-V Belts*
- *Air, Water, Fire, Steam, Suction and Cement Discharge Hose*
- *Rubber Lining for Ball Mills*
- *Chute Lining*
- *Dredging Sleeves*
- *Packing . . and*
- *A Complete Line of Miscellaneous Rubber Items*

Goodrich

TRUE COST OF GOODRICH OTHER CONVEYOR BELT AT ANY PRICE



Goodrich Belt, on an enormous construction job, handling 500 yards per hour from three shovels.

Goodrich is so sure its conveyor belts will last longer, will reduce maintenance, will minimize costly shut-downs, that we go out of our way to welcome comparison on an actual dollars and cents basis. We have prepared a record form with a sheet for every conveyor. With it you can arrive at the exact belting cost per ton of material handled—the only true way to measure what you pay for belting.

Why can Goodrich be so sure of the showing its belt will make? Because modern Goodrich Conveyor Belt represents seven major improvements. All are important to you who use belts. Consider just one of these seven features—the foldless edge:

Goodrich Conveyor Belt is made with a foldless edge—each ply terminates at the outer edge. This is what makes it possible to eliminate all longitudinal seams in the outer ply of every Goodrich belt up to 54″ in width. It is at the seams in the outer plies that conveyor belts start to break down. Goodrich belts simply *do not have* this danger point — their foldless edge and seamless outer ply are assurance of longer life, greater freedom from trouble and expense.

This foldless edge is only one of the seven features which make Goodrich Conveyor Belt last longer, and cost less per ton handled. Tell us the number of conveyors you have and we will send you, free, a book of forms so that you can arrive at true belt cost by the actual records of your own operation. Then next time you order conveyor belt, specify Goodrich, and let its record prove its economy over any comparable belt. The B. F. Goodrich Company, Mechanical Rubber Goods Division, Akron, Ohio.

One of the four severe tests which every batch of Goodrich conveyor belt rubber must pass.

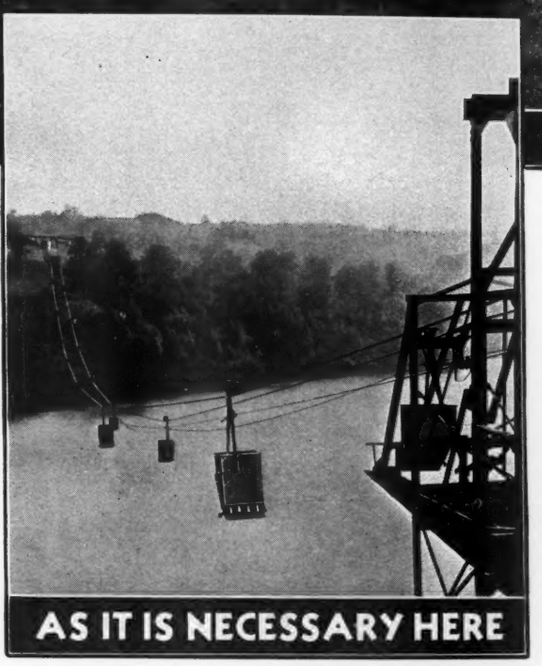
Goodrich 26 in. 8 ply Elevator Belt in excellent condition after more than five years' hard use handling crushed stone.

ALL products problems IN RUBBER

Conveyor Belting

THE "AERIAL TRAM LINE"
is a "bee line"

AS ECONOMICAL HERE



AS IT IS NECESSARY HERE

ALWAYS, when chasms or water or hilly ground step in to block off the delivery of materials—the cry goes up for an Aerial Tramway. And rightly so. Because—9 times out of 10—no method other than the "bee line" method of the "tram" could tackle such a job and "whip" it. But—and, this is equally true—there is scarcely a transportation job on any kind of terrain—no matter how easy of access—where the use of an **American Steel & Wire Company Aerial Tramway**—will not increase efficiency and lower costs materially. Steadier operation—never interrupted by bad weather—greater tonnage capacity per hour—lower cost per ton mile. Surely such advantages are worth your looking into. Our engineers will be glad to investigate and report their findings on your transportation problems. Send for our new Aerial Tramway Handbook.

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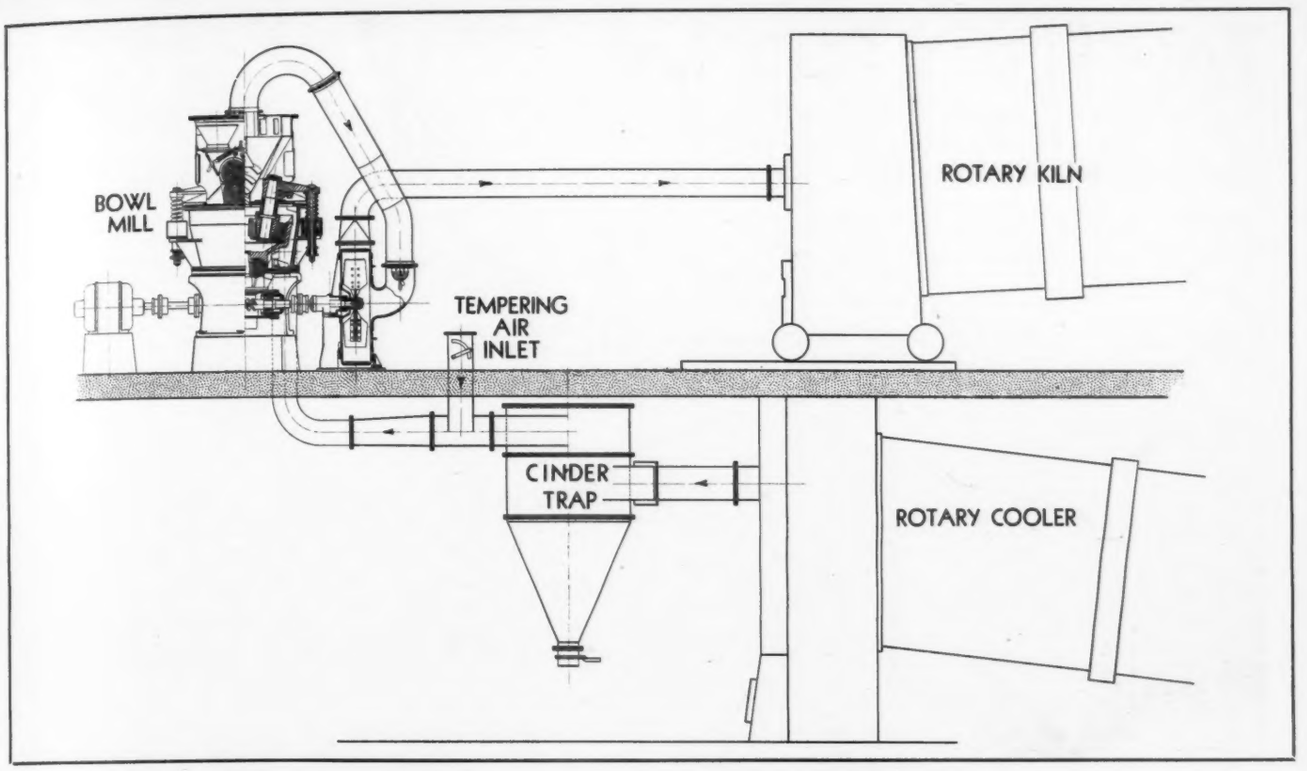

Flow sheet of Bowl Mill direct-firing rotary kiln.

"Raising the Ratio" with Bowl Mill firing

RAYMOND BOWL MILL
For grinding coal and miscellaneous non-metallic minerals and manufactured products.

SEARCH the records of the coal-grinding field, and we doubt if you will find any machine that has *made good* so fast, as the Raymond BOWL MILL.

Comparatively a new-comer, the BOWL MILL is beating the old-timers in output per kilowatt, on upkeep economy, and on income per dollar of investment.

The following report on a recent installation is typical of BOWL MILL performance.

In direct-firing a rotary lime kiln, the BOWL MILL replaced producer gas—and definitely increased the lime-to-coal ratio from less than 2 : 1, up to more than 3 : 1—results that speak for themselves.

The BOWL MILL was specially designed and built for its job, and it has everything that modern engineering skill, and 48 years' experience, could put into it to insure continuous operation without shutdowns—quiet running—easy control—unfailing lubrication.

RAYMOND BROS. IMPACT PULVERIZER CO.

1307 North Branch Street Chicago

Division of Combustion Engineering Co., Inc., Sales Offices in all Principal Cities, Canadian Representative: Combustion Engineering Corporation, Ltd., Montreal

The new BOWL MILL BULLETIN gives complete details

RAYMOND

PULVERIZING • SEPARATING • FLASH DRYING • DUST COLLECTING

The Koehring Wheel Dumptor
for hauling · dumping · spreading

Proven Performance

—in quarry operation for stripping work. 4 of a fleet of 7 Koehring Dumptors hauling and dumping the over-burden at costs lower than any previous method. Front dump, eliminating time-consuming backing and turning, greatly increases production. Repeat orders for this type of work are proof of the efficient and economical performance of Koehring Dumptors.

The automatic kick-out pan insures a clean and speedy dump for any type of material. The load is instantaneously dumped by force of gravity, without mechanical complications.

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Obviously

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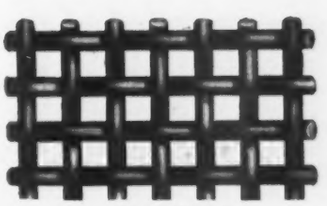
A wire screen is just as good and no better than the wire of which it is fabricated. Screening will give long, trouble-free service only if strength and stamina are inherent qualities of the wire which goes into the screen.

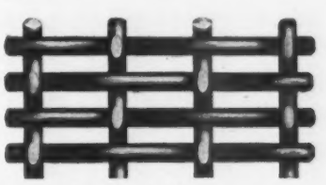
Making wire has been Roebling's business for 90 years—over 50 years in the making of wire fabric. This background—these years of experience which go into every screen we deliver, are available to help in the solution of your wire screen problems.

Roebling Wire Screens for sizing, cleaning and grading are made in a variety of types and metals to meet even the severest requirements as to efficiency and resistance to vibration and abrasion.

We would welcome your inquiry and an opportunity to cooperate with you.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON, N. J. *Branches in Principal Cities*


Square Mesh Wire Screen


Oblong Mesh Wire Screen

ROEBLING *Wire Screen*

TRADE JERSEY MARK

ROEBLING — MAKERS OF WOVEN WIRE FABRICS FOR OVER HALF A CENTURY

Two Types of Screens

.... *which do you need in your plant?*

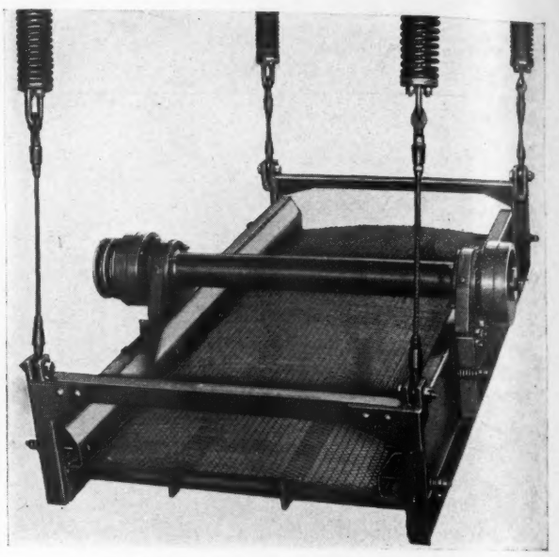
ALLIS-CHALMERS vibrating screens are available in two types . . . in sizes suitable for every plant. They are used for sizing crushed stone, slag, ore, sand and gravel, coal and coke, wood chips, commercial fertilizer, in fact, nearly all kinds of materials sized for commercial purposes, either wet or dry.

Aero-Vibe Screens

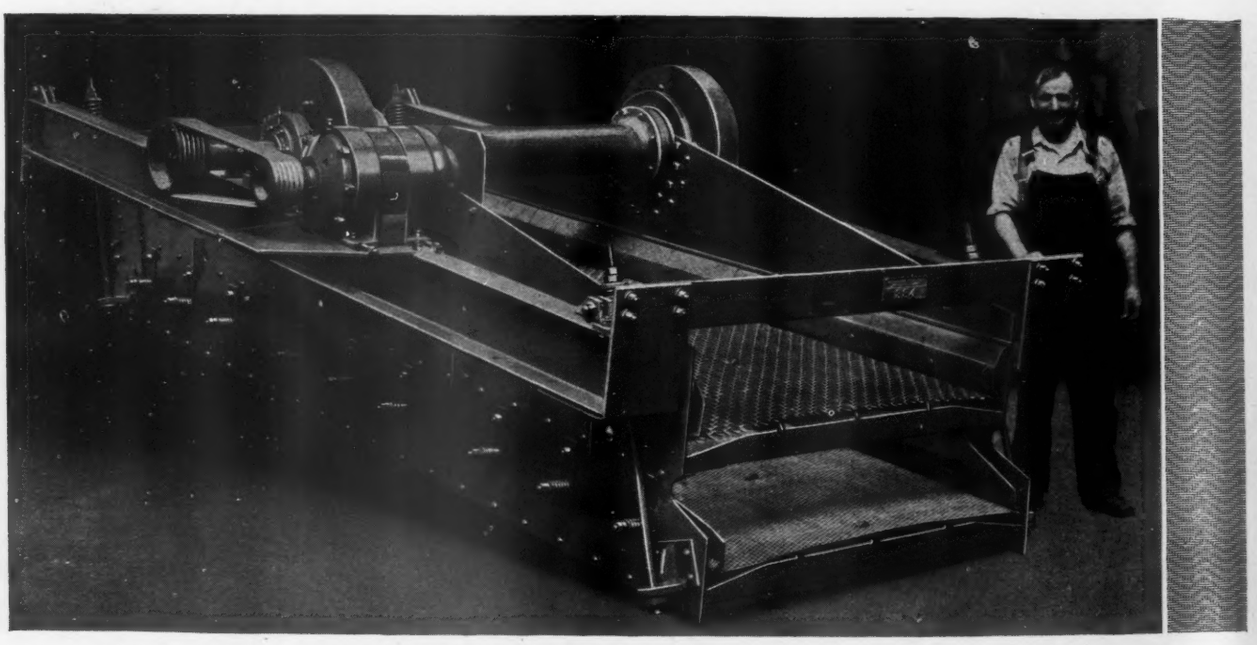
The "Aero-Vibe" screen "floats in the air" suspended from the supporting structure by cables and springs. A rapid, adjustable, vibrating motion is produced by counterweighted wheels mounted on the drive shaft supported in anti-friction bearings above the screen body or vibrating member. Single and double deck "Aero-Vibe" screens are available from 1½ x 3 ft. to 4 x 10 ft. sizes for handling medium to fine size materials, and for limited tonnage.

Centrifugal Vibrating Screens

Style "B" Centrifugal screens are built with one, two, or three decks in sizes from 2 x 6 ft. to 5 x 14 ft. and are adaptable for heavy loads and the maximum range of material size. The screening action, which is equally intense for all tonnages, is transmitted to the screen body or vibrating member by an eccentric shaft located above the screen and supported in anti-friction bearings. The screen body "floats" on balance springs reducing power and the load on the bearings; the entire screen is cable and spring suspended.



3'x6' Single Deck Aero-Vibe Screen



5'x14' Double Deck Style "B" Centrifugal Vibrating Screen

ALLIS-CHALMERS

— Allis-Chalmers Manufacturing Company, Milwaukee, Wisconsin, U.S.A. —

DU PONT NITRAMON

the safer blasting agent

is available in four grades

INTRODUCED in January of this year, Nitramon's revolutionary safety features, combined with its efficiency, created a sensation in the explosives industry. Four years of laboratory developments preceded Nitramon's entrance into the quarry and open-pit fields employing well-drill holes in their blasting operations.

Nitramon has these advantages

Based on nine months of field experience, here are some of the advantages of Nitramon over any blasting agent previously used in well-drill blasting operations:

1. Safety—Nitramon can be detonated only with a high-explosive cartridge.
2. Convenience—Nitramon is packed in water-proof metal containers of various dimensions for convenience in handling and loading.
3. Economy—Performances have shown that savings of 7% to 20% are possible when Nitramon is properly used.
4. Adaptability—Nitramon is manufactured in four grades to meet all well-drill blasting requirements.

Every Nitramon container is identified by the DU PONT "oval"—the mark standing for progress, integrity and dependence in the development and manufacture of explosives.

For specific information relative to grades and methods of using Nitramon, address inquiries to our nearest office.

E. I. DU PONT DE NEMOURS & COMPANY, Inc.
Explosives Department, Wilmington, Delaware

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When you are in the frame of mind to want a good dependable Wire Rope on your next replacement, may we leave this thought with you, that

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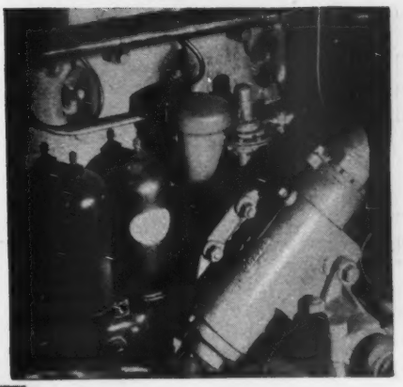

A "BAKER'S DOZEN"

From the many hundred operators of commercial motor vehicles who have found valuable savings in Texaco Products and the helpful cooperation offered by Texaco service, here are just a few, a representative "baker's dozen," selected at random from the wide range of trucking fields.

ASBESTOS TRANSPORTATION CO.
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Selecting the RIGHT OILS exactly suited to your vehicles is always profitable because maintenance — one of your largest operating expenses — is determined by how an oil meets each particular condition.

Mileage figures, maintenance and repair expenses from some of the country's largest truck and bus fleets in operation prove the economy and superior performance of Texaco Fuels and Lubricants.

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Your own men — those who know most about your equipment and operating conditions — plus Texaco's knowledge and experience with the right fuels and lubricants, will result in immediate benefits. Why not ask about this friendly, helpful service when the Texaco representative calls?

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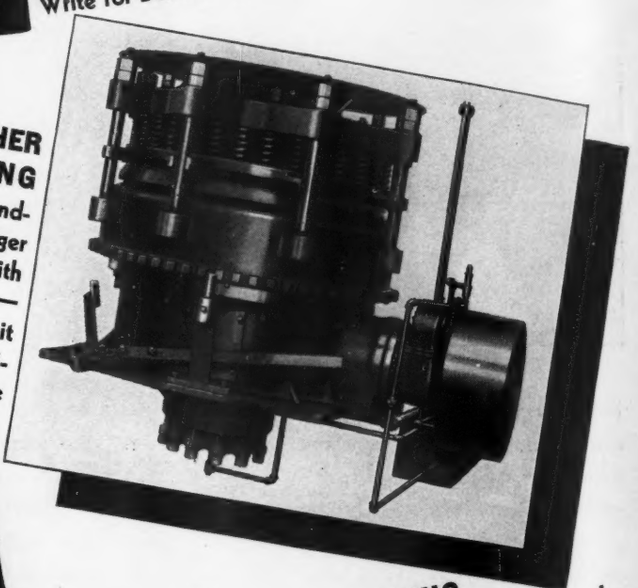
This 3-piece combination of Telsmith equipment is a striking example of group efficiency. Modern in every sense of the word . . . each piece is designed and built to better the product and cut operating costs.

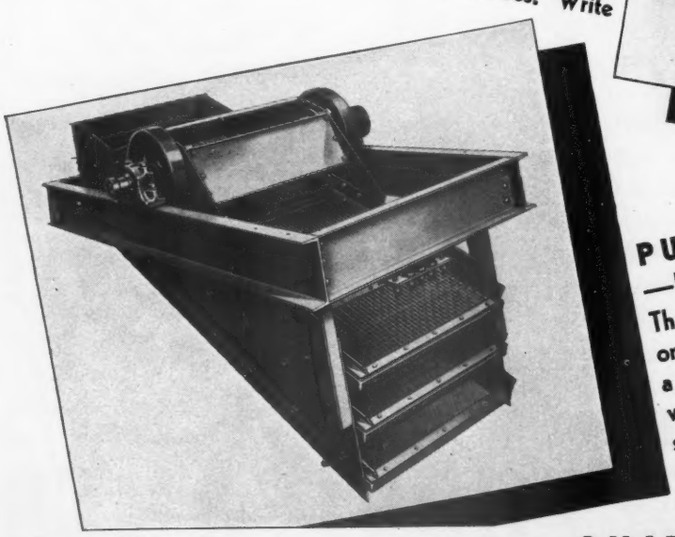
WHEELING JAW CRUSHER —FOR COARSE CRUSHING

With its compact, rugged steel structure and cylindrical roller bearings, the Telsmith-Wheeling Jaw Crusher is ideal for coarse crushing. The roller bearings, force feed and higher speed almost double the capacity without any greater expenditure for power. Simple adjustment allows wide sizing range. Up-keep is reduced to a minimum. Write for Bulletin W-11.



GYRASPHERE CRUSHER —FOR FINER CRUSHING

The Telsmith Gyrasphere takes the trouble out of secondary crushing. Working at choke feed, it turns out a bigger tonnage and more cubical product—crushes finer, with low power consumption and up-keep. The reasons—spring relief, rotary head support, spherical head, unit spring design, anti-friction thrust bearings, pressure lubrication, improved distribution of crusher pressures. Write for Bulletin Y-11.



PULSATOR —FOR EFFICIENT SCREENING

The Telsmith Pulsator screens crushed rock, sand, gravel, ore or coal . . . wet or dry. Its circular movement produces a maximum screening action, uniform on every inch of the wire, on every deck, under any load. The toughest alloy steels, the finest anti-friction bearings and special labyrinth and piston ring steels (to protect working parts) give longer life and lower up-keep. Write for Bulletin V-11.

M-3

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With which is Incorporated CEMENT and ENGINEERING NEWS Founded 1896

Volume XXXVIII Chicago, October, 1935 Number 11

"PUBLIC WORKS" Selected by Simple ARITHMETIC— Politics of Business

EARLY in the year the President asked Congress for a new appropriation of $4,880,000,000, to be used to inaugurate construction of lasting, useful public works; the dole was to end; *work* was to be provided for all able-bodied citizens "until industry was able to take up the slack." The administration had had two years' experience in mobilizing public works projects—it was claimed there were enough projects on file to absorb the new appropriation.

For months industry awaited starting of these public works, sure that one of the byproducts would be extensive reëmployment in the capital goods industry, where the bulk of unemployment existed—still exists. Industry knew that money received by contractors for public works was spent for labor, materials and equipment; that money spent for materials went for labor, more materials and more equipment, that money spent for equipment went for labor and machine tools to make equipment; and so on *ad infinitum*. It was common knowledge to every one except the higher-ups at Washington, D. C., that a dollar spent for legitimate public works done by a contractor changed hands at least five or six times in the course of a year, so that a $4,000,000,000 public works program meant an increase in the business volume of the country of probably $20,000,000,000, at least.

The program never started because the President had all projects submitted to WPA Administrator Hopkins, who had a very simple test to apply. This consisted in the arithmetical division of the proposed cost of the project by the number of men to be *directly* employed on the job. This must give about $800 per man to be employed; or, obviously, reasoned Mr. Hopkins, the eleven or twelve million unemployed could not have jobs. Since none of the public works contemplated by states, cities, counties or other public works organizations could be done at a less expenditure than $1,500 to $5,000 per man actually employed on the job, chaos resulted. Months were spent recasting the projects to find some way to provide for materials of construction as well as for direct labor. Millions in the aggregate were wasted chasing back and forth to Washington, for telegrams and long distance telephone calls, etc. Most priceless of all, a whole construction season was wasted.

All this has ended as a few "in the know" anticipated, by the President deciding that it was too late to start public works and the only way to avoid the dole (direct relief) was the "boon-doggling" type of public works, which is now much in evidence. It is said that *only one* of the grade-crossing projects, which were to be such an important part of the program, has actually been completed! Highway construction has been far less active than a year ago, although state highway engineers everywhere were fully prepared to start work last spring.

More than 1000 WPA "workers" from New York City were assigned to Floyd Bennett air port "to work." When they arrived there, August 28, no one was present to tell 'em what to do, or what kind of jobs they were supposed to have. Pilots attempting to land planes at the air port spent jittery mome nts trying to come down on a field liberally sprinkled with idle men. This is typical of where most of WPA money goes fo r "public works of permanent value," according to the President's promise to Congress

Acme Photo

Business in Politics

With this exhibition of "economic planning," it is not surprising that business and industry are now quite convinced that this administration (as probably any political organization) is wholly incompetent to plan the economics of industry and business as a whole, as it so bravely started out to do. Consequently business men everywhere are becoming active in politics, at least to the extent of using all their power to defeat the present political organization in the 1936 elections. Business journals, with many an apology and explanation, are becoming partisan for the first time in their history. They argue that since partisan politics is preventing business recovery, business is justified in becoming politically partisan. ROCK PRODUCTS has no intention of becoming a partisan journal.

We think the present administration has done some constructive things for business and industry; that when the smoke of battle has cleared away and all become adjusted to the new era, most business men will admit it. There is no denying that there have been some asinine things done too. Whether one side will balance the other is too early to tell. Some progress has certainly been made toward a more intelligent control of production of all commodities, in spite of the criticism heaped on the administration.

If we can ever differentiate the constructive results of these experiments from the destructive ones; and if this administration or some subsequent one can retain the one and discard the other, business and industry will have profited much by the experience. For example, it was asinine for staple commodities to be sold periodically for less than their cost; and it seemed logical to assume that *price* could be more easily manipulated than cost, since revision of cost meant tremendous sacrifices by labor and innocent investors, but profits to knowing speculators. Business as a whole asked for it.

Now many industries feel strong enough and independent enough to want all government regulation cast aside. We still are not convinced that the theory was greatly at fault; we think that its failure, if it is a failure, was due to its application by theorists inexperienced in business. Hence, we believe that much of it will be retained, and in the future applied with more practicality, or wisdom.

Constitutional Government!

The Constitution of the United States will not save us from an ever constant tendency toward centralization and collectivism. This tendency has existed since the birth of the nation. Moreover, with all due respect to the Constitution, which business men are apparently becoming familiar with for the first time, it was never intended for a *democracy*. Nearly all the distinguished men who took part in the drafting of the Constitution profoundly distrusted the common rabble. Neither President nor Senators were originally elected by popular vote. Party government was not contemplated. The great office of President was to seek the outstanding patriot, who was to represent all the states, not the people—he was to be elected by electors chosen by the sovereign states. The active head of a partisan group seeking the office of President by fair means and foul, by appeal to the mob, was not provided for in the original Constitution.

The direct election of the President and Senators by popular vote was a far greater departure from the intent of the founders than anything that has been proposed since. The reason for it was that the state legislatures had become corrupt as a result of their contacts with business and business men. That same idea that the Washington government would be less corruptible than local governments has led to a constant augmentation of the powers and functions of the central government at Washington. We see it in action today in the assumption of police powers by the so-called G-men—one thing above all others that the framers of the Constitution feared; for central police powers throughout all history have inevitably led to tyrannies. We see it in the leaning more and more of local government on the Washington government for poor relief, and inevitably, the resulting domination of local politics by the central government.

These things are pointed out here because they have an important bearing on this urge to put business as a unit into partisan politics. The part that business could well play is not in attacking the central government at Washington, but in turning its attention to purifying and thus strengthening local governments. Business as a whole was the cause of the corruption of these local governments, and it was their corruption which led, step by step, to the mess we find ourselves in today. The logical cure is not to tackle the top, but the foundation on which it is built up.

We never shall have the kind of a constitutional government the founders designed until we get back to the principle upon which the Constitution is really founded—*representative government*, that is a republic and not a national democracy. Responsible local self-government is the keystone, and here most assuredly business and industry can be of vast help—and without being partisan.

FHA Emphasizes Fire Prevention

THE Federal Housing Administration, which is conducting about the only constructive effort to get this country out of the depression, has seized upon another opportunity to help the building industry. It is going to participate actively in National Fire Prevention week, October 6-12.

Attention of contractors and building supply dealers is called to the fact that 22% of all residential fires start in attics and roofs, and that the remedy is better chimneys and fire-resistant roof coverings. Over 50% of all residential fires start in basements, and the best preventive is fire-resistant ceilings which are made of metal lath and cement plaster, or better yet, of reinforced-concrete joists and slabs.

There is an enormously large potential market here for rock products producers and manufacturers, but a market that calls for special technique in development.

Road Congress—1936

THE American Road Builders' Association has announced that an "old-fashioned" road show will be held in Cleveland, Ohio, the week of January 20, 1936. This means an exhibit of full-sized equipment and all the "trimmings" that exhibitors feel they can afford under present conditions. Most of us still remember the last old-fashioned road show at Cleveland—in prohibition days!

Ohio Mineral Aggregates Association "Never Was"

PRODUCERS of crushed stone, sand and gravel and slag met on August 9 and resolved that "it was not practicable at the present time to consummate the proposed Ohio Mineral Aggregates Association as planned."

The Ohio Sand and Gravel Association has been resurrected with a new constitution and a new executive secretary—Claude L. Clark. Mr. Clark, prior to December, 1933, was secretary of the Ohio Crushed Stone Association. During the life of the NRA code he was secretary of Region 8 under the code.

Stephen Stepanian of the Arrow Sand & Gravel Co. of Columbus was elected president of the association. A. E. Frosch of the Eastern Ohio Sand & Supply Co. of East Liverpool, was named vice-president; J. H. Evans of the Sturm & Dillard Co., Huntington Bank Building, is treasurer.

The revised constitution and by-laws adopted provide for a board of 20 directors, who were elected to serve until the first annual meeting which will be held on the first Tuesday in February.

Members of the board of directors include besides the officers named: C. E. Glander of Greenville; W. O. Brewer of Chillicothe; H. C. Slater of Columbus; Mr. Frosch, D. S. Poland of Dayton; H. D. Stillion of Zanesville; Earl Zimmerman of Cincinnati; L. D. Vincent of Parkersburg, W. Va.; F. C. Fuller of Portsmouth; Hal G. Knight, of Akron; Ray Van Camp of Cincinnati; J. J. Gorman of Dresden; Zain Armitage of Lebanon; Charles Oberle of Cincinnati; Mr. Stepanian, W. L. Talbott of Chillicothe; E. P. Thomas of Navarra; M. T. Epling of Gallipolis; W. P. Watson of Hamilton, and Mr. Evans.

Harmony in Indiana

THERE is now an Indiana Mineral Aggregates Association—operating successfully and harmoniously without the benefit of NRA. If NRA had accomplished nothing more, this would be considered an achievement by those who knew Indiana of old. "Sam" C. Hadden is executive secretary; maybe he, as well as NRA, is responsible.

Mineral Aggregates Institute Moves Cautiously

BOARD OF GOVERNORS of the Mineral Aggregates Institute met in Washington, D. C., August 20, and adopted a set of rules and regulations that elaborate very little the original definition of the institute. The three member associations, National Crushed Stone Association, National Sand and Gravel Association and National Slag Association, are to pay $500 a year each for the upkeep of the institute, but apparently not even a clerk is to be directly employed and paid by the institute.

Aggregates Industries Convention

PLACE AND TIME of the 1936 annual conventions of the National Crushed Stone Association, National Sand and Gravel Association and National Slag Association are picked: St. Louis, Mo., Jefferson Hotel, January 27-31. The conventions will be concurrent, with at least one common session under the auspices of the Mineral Aggregates Institute. There will also be a joint machinery and equipment exhibit, which will be formally opened on the evening of January 27.

Details of the program will be announced later; but irrespective of what this may contain, it is obvious that present conditions and circumstances make this an extraordinarily important gathering.

Aggregates Industries Help Save Life of NRA

IN SPITE of the fact that legitimate reason for its existence ended months ago NRA still has 2760 employes and an annual payroll of $7,000,000. So it is "studying" 10 representative industries to while away the time. The crushed stone, sand and gravel and slag industries are one group being studied for confidential information to aid in the preparation of new NRA legislation.

Final Figures on 1934 Production Show Inroads of Public-Owned Plants

THE total sand and gravel reported as sold or used by 1,925 commercial producers in the United States in 1934 amounted to 75,322,909 short tons valued at $48,364,767, an increase of 13.9% in quantity and 6.7% in average value per ton compared with 1933. In addition, production of sand and gravel from about 400 state, county, and municipal operations was reported to the Bureau of Mines; this material totaled 41,288,780 short tons valued at $12,882,406, decreases of 0.9% in tonnage and 6.1% in average value per ton compared with 1933. The total output of sand and gravel accounted for in the canvass by the Bureau of Mines was therefore 116,611,689 short tons valued at $61,247,173.

Production by commercial operations was virtually identical with the preliminary figure released early in 1934. The output of noncommercial operations, however, was greater than preliminary data indicated, and as a result total production for the year exceeded the preliminary figure by 3%.

Noncommercial Productions

Although a smaller number of schedules were returned from noncommercial operations in 1934 than in 1933 the output of this material was about the same in the two years. The decline in number of returns was due in part to a trend toward consolidating individual county reports with state reports.

As in previous years only a small part (23% in 1934) of the sand and gravel produced by noncommercial operations was washed, screened, or otherwise prepared to make it comparable in quality with the output of the average commercial plant. By far the larger part consisted of pit-run material having a low unit value.

Additional data regarding the output of noncommercial operations were collected for the year 1934. Noncommercial production included 20,314,296 short tons valued at $0.22 a ton produced directly by construction and maintenance crews of states, counties, municipalities, and other government agencies and 20,974,484 tons valued at $0.40 a ton produced by contractors expressly for the use of these agencies. Furthermore, 68% of the total was reported by state highway officials, 28% by counties, 1% by municipalities, and 3% by other agencies.

Crushed Stone

Production of crushed stone for concrete and road metal increased from 40,857,120 short tons in 1933 to 55,244,470 tons in 1934, and railroad ballast from 4,633,490 tons in 1933 to 5,323,450 tons in 1934, advances of 35 and 15%, respectively. The average value per ton also increased in 1934.

Noncommercial production amounted to 17,308,740 short tons, more than double that reported in 1933. Of this quantity about half was produced directly by states, counties, municipalities, and other government agencies, and the other half by contractors expressly for these agencies.

CRUSHED STONE SOLD OR USED BY COMMERCIAL AND NON-COMMERCIAL OPERATORS IN THE UNITED STATES, 1930-34[1]

	—Commercial operations—			Non-commercial operations[2]			—Total—	
Year	Quantity, short tons	Change from previous year, per cent	Per cent of total	Quantity, short tons	Change from previous year, per cent	Per cent of total	Quantity, short tons	Change from previous year, per cent
1930	79,560,890	— 6.8	91.3	7,550,000	+ 3.3	8.7	87,110,890	— 6.1
1931	64,818,410	—18.5	89.3	7,806,000	+ 3.4	10.7	72,624,410	—16.6
1932	43,284,190	—33.2	83.2	8,710,910	+ 11.6	16.8	51,995,100	—28.4
1933[3]	37,839,200	—12.6	83.2	7,651,410	— 12.2	16.8	45,490,610	—12.5
1934[3]	43,259,180	+14.3	71.4	17,308,740	+126.2	28.6	60,567,920	+33.1

[1]Includes stone for concrete and road metal and railroad ballast. Figures for "non-commercial operations" represent tonnages reported by states, counties, municipalities, and other government agencies, produced either by themselves or by contractors expressly for their consumption, often with publicly owned equipment; they do not include purchases from commercial producers. Figures for "commercial operations" represent tonnages reported by all other producers.

[2]Includes 8,530,220 short tons valued at $0.92 a ton produced directly by construction and maintenance crews of states, counties, municipalities, and other government agencies and 8,778,520 short tons valued at $0.91 a ton produced by contractors expressly for these agencies.

[3]1933: Average value per ton of commercial stone, $0.84; non-commercial stone, $0.95; 1934: Average value per ton of commercial stone, $0.94; non-commercial stone, $0.91.

Auxiliary Crushing Plant of Chemical Lime Operation

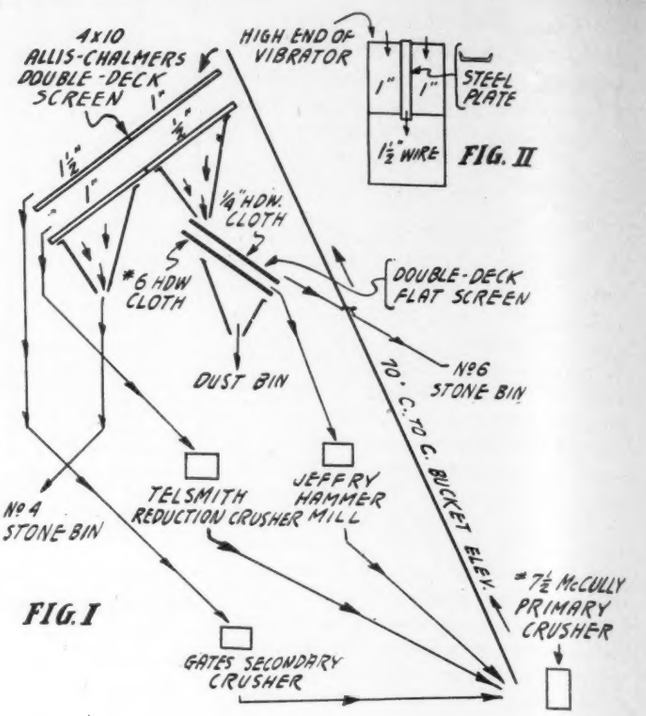
THE Scioto Lime and Stone Co., Delaware, Ohio, is now operating a crushed stone plant at Scioto, Ohio. The plant, which was built a year ago, is located a short distance from the lime plant. The company has become more and more interested in high grade chemical lime and is using a soft stone high in calcium for this purpose. The harder top ledge of blue stone, which contains iron and alumina as impurities, is crushed in the new plant mainly for use in road maintenance. The dust is sold as agricultural limestone.

An Osgood steam shovel with a ¾-yd. bucket loads motor trucks, which haul the rock directly to the crushing plant, where they dump directly into the No. 7½ McCully primary crusher. A bucket elevator equipped with 154 buckets spaced 1 ft. apart carries the crushed rock up to an Allis-Chalmers 10x4-ft. double deck vibrating screen ("Aero-Vibe" type). The top deck of the screen is divided into 1-in. openings and 1½-in. openings, as shown in the sketch, and the bottom deck has ½-in. and 1-in. openings. Rock retained on the 1½-in. screen passes to a No. 5 Gates secondary crusher and then to the foot of the elevator to be re-elevated. Stone retained on the 1-in. mesh of the lower deck goes to a Telsmith 2A reduction crusher and then to the foot of the elevator to be re-elevated. Stone retained on the ½-in. lower deck wire but passing the 1-in. wire goes direct to the No. 4 stone bin.

Stone passing through the ½-in. openings in the lower deck goes to a "double deck" stationary gravity screen 8 ft. by 18 in. directly below. The upper "deck" has a ¼-in. mesh and the lower deck a No. 6 mesh cloth. Material passing through both decks goes to the dust bin. The stone retained on the ¼-in. cloth goes direct to the No. 6 stone bin. The stone passing through the ¼-in. but retained on the No. 6 cloth goes to a 20x24-in. Jeffrey hammer-mill and then to the foot of the elevator to be re-elevated.

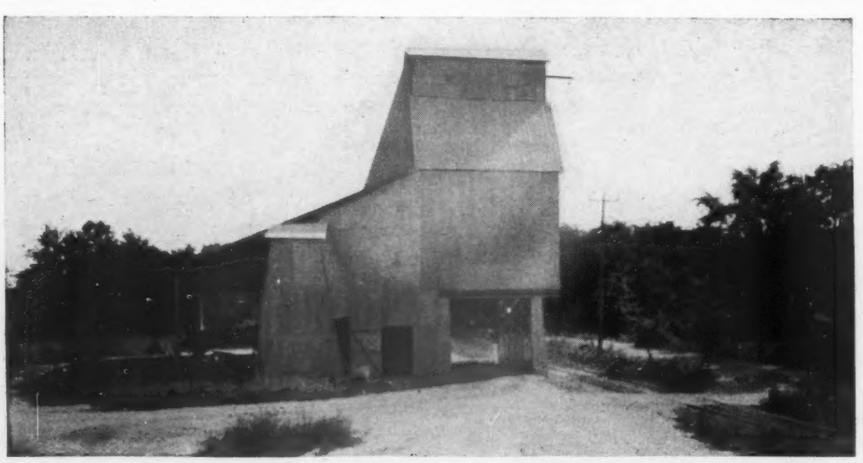
Fig. 1. Flow-sheet of Scioto Lime and Stone Co. crushed stone plant

Fig. 2. Method of obtaining more fines in finished product.



When a special stone size or mixture is required, demanding a higher percentage of fines, a "detour" plate half the length of the screen (14 in. wide) is placed on the top deck, and part of the discharge from the head end of the elevator is guided over it by wood guides. The sides of this plate are turned up, and the rock passes through this trough to the lower section of the screen (top deck).

The plant is equipped with four 60-ton bins and two 90-ton bins, and, when operating full, has a capacity of 25 tons per hour. The bins are built to provide for truck haulage. Each chute from the bins to the trucks is equipped with five water-spray nozzles to give the rock a washing as it goes to the trucks, the excess water and dirt passing through a fine screen in the bottom of each chute to a waste sump. A Weiman pump with a 2-in. suction and 1½-in. discharge pumps the wash water from an abandoned quarry a distance of 1500 ft. to the plant—150 g.p.m. are supplied under 50-lb. pressure.



New crushing and screening plant of Scioto Lime and Stone Co.

Safety Congress—Louisville, Ky., October 14-18

THE annual Safety Congress and Exposition will be held this year at Louisville, Ky., October 14-18, inclusive. The program of the Cement Section in a joint session with the Quarry Section will be held Wednesday, October 16 and Thursday, October 17. This program includes an address by E. J. Mehren, president of the Portland Cement Association; "Cause and Prevention of Injuries from Machinery in Operation," by W. M. Cabannis, assistant superintendent, Signal Mountain Portland Cement Co.; "Review of the Best Safety Educational Features Used by Ten Cement Plants," by R. H. MacFetridge, superintendent, Lehigh Portland Cement Co., Birmingham, Ala.; "Dust Hazards in the Quarry Industry," by J. William Fehnel, chemist, industrial hygiene laboratory, Metropolitan Life Insurance Co.; an address by H. F. Yotter, insurance supervisor and safety engineer, General Crushed Stone Co.; and other papers and addresses not yet announced.

Honest Highway Engineers!

Massachusetts state highway engineers condemned crushed stone produced at Amesbury municipal quarry and the town is compelled to buy the commercial article.

Notes on Gypsum and Its Products

By A. M. Turner,
Supervisor of Plaster Quality, Three Forks Portland Cement Co., Hanover, Mont.

THE COMMON QUESTIONS pertaining to the quality of gypsum and its products have frequently been discussed and presumably the subject is quite thoroughly understood. However, in this article the attempt has been made to adhere to questions about which little, if any, information has been written, and to mention some odd facts or circumstances which may have appeal from a general interest standpoint.

Plastering on Concrete Walls

In buildings where the construction consists of concrete walls, regular gypsum plaster cannot ordinarily be applied with entire satisfaction. The reason for this is that the coefficients of expansion of the plaster and of the concrete are considerably different, and this has a tendency to create a shearing action that will break the bond. Also the concrete may convey enough moisture to the plaster so that the bond will weaken and eventually break.

Gypsum plaster manufacturers prepare a special plaster which will bond satisfactorily on concrete walls. This plaster is nothing more or less than a certain amount of hydrated lime mixed with wood fibered plaster. The lime corrects the difference in expansion to a large extent and is advantageous in keeping the moisture from doing damage to the plaster.

Tests of Effects of Lime in Plaster

To study the effect lime had in making plaster adhere more tightly to concrete, tests were made as follows: Half sections of cement briquettes which had been made with 1 part of cement and 3 parts of standard testing sand were used. These sections of briquettes which were thoroughly set and dry were placed in moulds. The half briquettes were then made into whole ones by pouring different mixtures of wood fiber plaster and hydrated lime into the moulds. When the plaster in the moulds was set and dry, the briquettes were broken in a tensile strength machine and the breaking strength recorded as shown in the following table:

Lb. lime to the ton of wood fiber plaster	0	25	50	75	125	150
Tensile strength of bond between cement and plaster in lb. per sq. in..	47	171	175	141	86	0

The table shows that the addition of lime has increased the bond between the two materials and the maximum strength is secured by using somewhere between 25 and 75 lb. of hydrated lime to the ton of wood fibered plaster. No doubt the lime content would vary with different brands of plaster. It may be well to mention that when using lime, additional retarder will have to be added to the plaster to counteract the accelerating effect of the lime. Ordinarily 75% more retarder than the wood fibered plaster usually carries should be added.

One thing which is just as important as the use of lime when plastering on concrete is to be sure that the concrete is clean, free from oil, alkali and efflorescence of any kind; and the surface of the concrete must be rough even if it is necessary to accomplish this last feature by the use of a chisel on the whole wall surface to be covered.

Keying Plaster to Concrete

There is one large plastering contractor who feels that he has found a system entirely satisfactory for plastering over concrete walls without the use of a special plaster. The plan which he follows is to first secure a fast setting plaster which corresponds to plaster of Paris, moulding plaster or something similar. This plaster is mixed thin enough so it can be whipped onto the wall with a brush. After this dash coat of plaster has thoroughly set, the wall, which now has a rough surface, may be plastered over in the usual way with ordinary gypsum plaster.

The plasterer who uses this method advances the theory that the plaster which is whipped against the concrete, penetrates pores in the walls and develops more or less of a mechanical key that is somewhat independent of bond between the two materials. Where plaster is troweled over the concrete the plaster would not penetrate the pores in the wall to form as satisfactory a mechanical bond.

Quick Method to Determine the Presence of Retarder

Occasionally it is desired to determine whether or not plaster contains retarder. This information may be required for the product at the factory or in the field. Of course a setting time test will usually tell the story, but the following test is more accurate and can be made in a few seconds' time.

The chemical used to make the test is phenolphthalein, which should be in the form of a saturated water solution. The solution can be purchased at any drug store at very little cost, and 4 ounces is a sufficient quantity to test several hundred sacks of plaster.

The method of testing is as follows: Take about one tablespoon of the plaster to be tested and place it in a pile upon a clean board or piece of glass. Now make a depression or little lake in the piles sufficiently large to hold about a teaspoonful of water. After pouring the water into the lake add about three drops of phenolphthalein. If retarder is present a pink color will immediately develop when the chemical is added. If convenient test at the same time several samples of plaster with known retarder content and one sample with no retarder in order to have a basis of comparison. The intensity of the color is almost in direct proportion to the amount of retarder present. This test has proved valuable to factory men as well as salesmen and service men who experience difficulty with plaster in the field.

Gypsum Analysis Kinks

As a whole the methods in general use for making gypsum analysis are quite satisfactory. However, most methods have certain pitfalls, which if not guarded against, may lead to considerable difficulty, particularly for the inexperienced analyst.

A quick method often used to determine the gypsum content of a sample is to weigh one gram of gypsum (from which the free moisture has been expelled), put in a crucible or platinum lid, heat at a temperature of about 800 deg. F. for one hour; then weigh to determine the loss which presumably is the combined water that was present in the gypsum. Needless to say, the final weighing must be made very rapidly, because the sample is not stable and the weight quickly changes. However, the most important fact to bring out is that the loss in weight upon heating is not always combined water, but sometimes proves to be organic matter associated with the gypsum.

The common method of determining SO_3 is the gravimetric process where the SO_3 in the gypsum is combined with barium and the precipitate is ignited and weighed. While in general this method is very simple the results may be off as much as 0.5% if the proper care is not exercised when igniting the precipitate. If the $BaSO_4$ is immediately subjected to a high temperature there will be a mechanical loss which will lead to incorrect results. Ignition should be accomplished by starting with a warm heat that is gradually raised until the filter paper completely ignites. A very satisfactory means of doing this is to place the precipitate in a small muffle furnace which is just warm. Then turn on the full heat and ignition will be complete in 20 to 30 minutes without any mechanical loss.

One laboratory was experiencing difficulty getting too high SO_3 results, even though their analysis method was accurately checked and found to be correct. Finally the distilled water was tested and proved to contain considerable sulphur. Tracing the source of the sulphur it was learned that the water still had recently had a new element installed. When this work was done the composition gasket originally used for the cover

of the still was damaged. The new gasket by which it was replaced was made of rubber. The steam and water coming in contact with the rubber apparently leached out the sulphur, which got into the distilled water container, thus causing the contamination. The proper kind of a gasket was installed in the still and no more difficulty was experienced.

Gypsum Oddities

Gypsite plaster has been made at Sweetwater, Tex., with a natural setting time so slow that no artificial retarder needed to be added.

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The natural setting time of gypsite plaster made at Laramie, Wyo., has been so fast at times that as much as 14 lb. of normal artificial retarder had to be used to the ton of plaster in order to make the setting time sufficiently slow so the product could be applied on the job.

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Samples of gypsite plaster which had been stored in a bath house for a period of about 20 years were once found by the writer. The action of natural elements and moisture originating from the shower provided excellent opportunity for the plaster to age as it had not been kept in air-tight containers. However, tests showed it to have practically no effects of aging and its quality was almost identical with freshly made material.

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In one gypsite deposit material from the top of the deposit may make much faster setting plaster than material from the bottom. The reverse condition may be true in another deposit.

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The gypsum vein being worked at Hanover, Mont., forms a complete circle. Eventually the working face of the mine will open into the original mine workings. The reason this vein of gypsum occurs this way is because the original horizontal deposit was pushed up into a dome formation. Since the top of the dome has been eroded away the gypsum outcrop now forms a circle.

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Authorities state that anhydrous calcium sulphate existing in a certain California deposit was caused by lava flowing over gypsum and causing it to become dehydrated.

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In the vicinity of Alamogordo, N. M., are dunes extending several miles in length and as much as 70 ft. high composed of gypsum sands of a high purity and very uniformly graded as to size. These sands have been carried by the wind from distant gypsum deposits and redeposited in this particular place forming dunes.

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A freak plaster complaint was once caused by the presence of wheat in the plaster. When it became wet in the plastered walls the wheat swelled, causing holes to pop open in the plaster. The source of the wheat was traced and the discovery made that the plaster had been shipped in bulk in cars that had previously carried wheat and were not thoroughly cleaned before loading plaster.

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In general the maximum temperature to which plaster is calcined varies from 320 deg. F. to 360 deg. F., even though all other conditions are practically the same. The question naturally arises as to what is the correct calcination temperature.

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A gypsum plant had been supplying a cement company with a crushed gypsum containing 5 or 6% of shale. The shale was black and occurred in about the same size pieces as the gypsum. The cement company upon receiving its shipments of rock noted that the shale was stratified in very definite layers in the car. Consequently they assumed that when the car was loaded an inferior grade of rock was periodically run into the car, and sent in a complaint to that effect. The truth of the matter was that the rock when loaded ran uniform in quality, a fact which was verified by chemical analysis. The only explanation that could be given for the shale becoming stratified was that the vibration of the car during transportation caused this selective separation of the contents to take place.

Regrinding May Accelerate Setting Time

A common practice for making plasters such as moulding, casting, pottery, etc., is to calcine a select grade of gypsum rock which has been coarsely ground (about 65% through a 100-mesh sieve) and then regrind the calcined material to a fineness of about 98% through a 100-mesh sieve. Buhr stones were the type of equipment which was used for grinding at the mill where the following experience was encountered.

Ordinarily the kettle samples had a setting time of 35 to 40 minutes and this material reground through buhr stones set in 30 to 35 minutes. Occasionally when the stones were started up the set was a little faster. The probable reason for this was that the heat generated during the previous grinding had liberated some water which set up a small quantity of plaster in the mill. This set plaster when finely ground naturally acted as an accelerator. On one particular occasion the product from the regrinding stones set consistently in 12 to 15 minutes even though the feed set in the customary 35 to 40 minutes. This difficulty persisted for a period of several days and the local operators were unable to solve the difficulty. An outside chemist was called on the job, and he apparently solved the problem as explained in the following paragraph.

The gypsum which was dumped from the kettles was elevated about 50 ft. and discharged into a screw conveyor which carried the material about 200 ft., where it was discharged and fell into a bin that was 15 ft. deep. Under this bin the regrind buhrs were located. They received their feed through a short spout leading from the bottom of the bin. The chemist in charge of the investigation maintained that the plaster falling from the conveyor discharge into the bin became aerated and combined with enough moisture to act as an accelerator when regrinding took place. To correct this difficulty a chute was built and placed at an incline leading from the conveyor discharge to the bottom of the bin. Subsequently the gypsum slid, more or less in a mass into the bin rather than falling into the bin in a shower. After this installation the quick set of the reground plaster did not exist.

Upon reflection the writer (who was not directly connected with this piece of work, but in close proximity) is inclined to feel that the cause and results connected with the problem were rather far-fetched, especially since the process as originally installed had been used with success for a considerable length of time. However, this incident has only been presented for what it may be worth and at least may serve as food for thought.

In line with the preceding, it may be of interest to mention that, when a tube mill is used for regrinding, the first material discharged is usually fast setting. The cause is obviously that condensed moisture generated from the previous run set a certain amount of plaster. This plaster when finely ground acted as an accelerator until discharged. To eliminate this difficulty a tube mill should be run empty for about 30 minutes before introducing the feed or else the first few tons of plaster discharged from the mill can be reclaimed.

Effect of Sand on Setting Time of Plaster

In the table which follows are shown the different setting times obtained with the same plaster used with five different kinds of sand. The sand all came from a comparatively small territory and each kind was used for plastering work in the same city. For general information the table shows the results of several other tests besides setting time. The colorimetric method of test may be found in Vol. XIX, Part 1, 1919, of the *Proceedings of the American Society for Testing Materials* as an appendix to the report of Committee C-9 on Concrete and Concrete Aggregates. The test is designed to show the relative amount of organic matter present in sand and is indicated by numbers from 1 to 5 inclusive, No. 1 showing the least amount and No. 5 the greatest amount of organic material.

The fact of interest proved by the above tests is that the setting time of plaster in one particular city varies from 9 hours and 30 minutes to 24 hours on account of the variation of sand which is used in this territory. This variation is probably greater than the difference in setting time between the plaster which manufacturers produce for their slow set markets and their fast set markets.

The city from which the sands in question came uses plaster, all of which has the same

Kind of Test	Standard Ottawa Hr. Min.	O'Leary Hr. Min.	Cockrane Hr. Min.	Edgar Hr. Min.	Carter Hr. Min.
	——Name of Sand——				
Setting time (1 part plaster, 2½ parts sand)	8 30	18 30	9 30	24 0	10 30
Sieve test—					
Per cent retained on 8-mesh	0	6	19	19	4½
Per cent retained on 50-mesh	100	75	76	79	46½
Per cent passing 100-mesh	0	4½	4	2½	13½
Per cent water required for mixture of 1 part plaster and 2½ parts sand	24	26	26	25	28
Colorimetric value (scale 1 to 5)	1	2	3	1	1

setting time, and in spite of the irregularity of the sand the plaster is used with a high degree of success. This fact brings up the question of the advisability of plaster manufacturers shipping plaster of various setting times to different parts of the country. It is true enough that the same plaster will have a different setting time in various localities on account of variation in sand and climatic condtions. However, the plasterers can usually meet these difficulties very skillfully and possibly with less confusion than is experienced by the manufacturer who is trying to meet the need of each individual community and in many cases is facing an impossible task caused by a sand condition as outlined in the results shown by the preceding table.

Cement manufacturers have the same standard of setting time for their cement regardless of where it is manufactured or shipped to in America, and there are many good reasons why the consumer might want a different setting time on one job than on another. It seems to the writer, whose work has dealt with the setting time of plaster for the last 12 years in half the states of the union, that one standard setting time for all gypsum wall plaster would be a worthwhile project for the gypsum industry to work towards.

Returns to Production

Cardiff Gypsum Co., Fort Dodge, Ia., has been reorganized and the plant reconditioned and put on a full production basis. It was formerly the Cardiff Gypsum Plaster Co.; recently reorganized with Ezra Sensibar, Chicago, Ill., president; T. F. Breen, Fort Dodge, one of the original organizers of the company and for many years its manager, vice-president; C. W. Gadd, Fort Dodge, treasurer, and Ira J. McConnell, who has been associated with the Cardiff firm for 15 years. Mr. Sensibar has been interested in the company for several years. These officers together with Justice Richard F. Mitchell and Martin Swalen of Fort Dodge make up the board of directors.

The reorganized company is capitalized for $30,000, all common stock. The stock is all locally owned by about 20 persons.

Martin Swalen, who has been with the Cardiff company since 1897, is the mill superintendent, and Francis Scott and Charles J. Munn, both veteran employes, are the mine superintendents.

The Cardiff mill for many years produced from 20,000 to 30,000 tons of gypsum products yearly and the company expects to build its production to this volume in a short time, Mr. Sensibar told a local newspaper reporter.

"Conditions are extremely favorable for the success of the company," Mr. Sensibar said. "The building outlook is bright and there is a growing market for our product. We believe that in a comparatively brief time we will have outlets for all the material our plant can produce. We are opening new markets for our products and this means new money for Fort Dodge. The plant is providing jobs for a sizable group of men and there will be more jobs if our hopes for future business are realized."

Sales Above 1934

United States Gypsum Co., Chicago, Ill., faces a bright outlook for the balance of the present season, officials of the company feel, and the usual seasonal upturn, now being felt, in sales and shipments of building material is expected to continue throughout the year. Present operations and shipments, which follow very closely demand by virtue of small inventories of finished products, are characterized as "very much better" thus far in the second half of 1935 compared with the corresponding 1934 period, and earnings are showing increases in line with the larger volume.

Gypsum Sales Increased in 1934 Over 1933

STATISTICS of the United States Bureau of Mines show that a 23% upturn in general construction activity in 1934 was reflected in a 15% increase in gypsum production, in spite of the continued slowness in residential building.

Crude gypsum produced in the United States in 1934 totaled 1,536,170 short tons, compared with 1,335,192 tons in 1933, the worst year since 1905, and 5,678,302 tons in 1925, the record year. Imports during 1934, largely from Canada, amounted to 360,186 tons, valued at $371,082, only slightly greater than in 1933. Sales of gypsum products in the United States manufactured from gypsum of both domestic and foreign origin amounted in 1934 to 1,140,590 short tons valued at $16,184,459, compared with 1,060,471 tons valued at $14,555,112 in 1933. Of the 1934 sales, 1,074,017 tons valued at $15,510,835, or well over 90%, were sold or used for building purposes.

Increases in output of gypsum were reported in every state except California which showed only a small decline. The four leading states together accounted for nearly two-thirds of the total output: New York produced 391,408 tons (363,745 tons in 1933); Michigan, 281,033 tons (211,392 tons in 1933); Iowa, 180,271 tons (172,555 tons in 1933); and Texas 138,326 tons (112,106 tons in 1933).

Calcined gypsum sales for building purposes amounted to $12,069,391; of this about $4,500,000 was for base-coat plasters and $4,500,000 for wall board.

World's Use of Cement Sacks

THE Bates valve bag, known to every manufacturer of rock products as a typical American invention—and a highly profitable one—is today the basis of a $20,000,000 a year industry with plants throughout the civilized world. There was recently held in New York an international convention of licensee manufacturers, which was given considerable newspaper publicity, with special emphasis on the fact that most of their product is used for packaging cement. Said the *New York Sun* of September 19:

"The Waldorf-Astoria might well be mistaken for a League of Nations headquarters this week. It is entertaining delegations from most of the prominent nations except Ethiopia. It is an impressive gathering, with all sessions conducted in three languages, and the delegates manage to look very distinguished indeed. On investigation one discovers that the twenty-eight representatives of the nations are manufacturers of paper bags.

"They aren't ordinary paper bags. They are paper bags designed especially to hold cement. It seems that cement follows the march of civilization, and wherever there is cement, the bags go too. Consequently the gathering at the Waldorf-Astoria virtually represents modern cement civilization. Only a few faraway countries, such as Siam, where cement has not yet made great inroads, failed to attend. The Japanese representative couldn't come either. He is busy following the march of civilization in Manchukuo. He is carrying paper bags and machines for putting the cement into paper bags into newly modernized territory.

"Mexico, Brazil, Finland, the leading European nations, and the Orient—all these are represented. The men here gathered are responsible for the making of 500,000,000 paper bags a year. In these are carried practically the whole world's annual supply of cement."

Merger Completed

National Gypsum Co., Buffalo, N. Y., has completed the details of its merger with the Universal Gypsum and Lime Co., Chicago, Ill., and National's common stock, traded on the Chicago Exchange, is shooting upward. In one day, September 24, it rose 4¾ points to 26¾. Trading in this one stock accounted for a fifth of all the trading done that day.

Combustion Economy in the Rotary Kiln*

Part 7—Practical Applications—To Increase Flame and Burning Zone Temperatures—Conclusions

By Robert S. Schultz, Jr.
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THE PRACTICAL APPLICATION of the many factors outlined in this series of articles to the burning of cement clinker in the rotary kiln requires a comparison with methods in present general use in the cement industry. In the following study, high volatile bituminous coal will be assumed as kiln fuel. Such coals form the principal fuel of the industry and their efficient combustion presents much the most difficult problem of the fuels in general use.

The usual present method of burning pulverized coal in the rotary cement kiln has been in use for over thirty years with little or no change, except in size, and no general improvement. The method consists of blowing the coal, roughly mixed with from 15% to 35% of the total air required for combustion, into the center of the kiln opening. Having gotten the fuel into the kiln, natural or mechanical draft and natural diffusion are depended on to take care of the balance of the combustion requirements and to complete this complicated and delicate chemical reaction efficiently.

The velocity of the primary air and coal mixture—the "blast" as it is frequently and aptly called—usually is between 12,000 ft. and 15,000 ft. per minute (200 to 250 ft. per sec.) and even higher velocities are not unusual. With the primary mixture entering the kiln at such high velocity, the first or heating stage of combustion, although extremely rapid, cannot be completed until the mixture has traveled several feet into the kiln.

Immediately after entering the kiln, the primary air velocity decreases rapidly and its volume increases but the velocity of the coal particles continues to be high. As a result of these rapid changes in velocities, initial contacting of the volatile combustible with the fresh air is high and the second stage of combustion starts with a burst of flame and high initial rates of combustion. The velocities, particularly of the coal particles, are still so high, however, that this initial burst of flame is stretched over several feet of kiln length and the combustion rate per foot of length is comparatively low and the flame temperature is also low. It is this first burst of flame which is usually seen on looking into a kiln. It is also this first burst of flame which produces the highest combustion rates and the highest flame temperatures, under the particular combustion conditions.

Following the first burst of flame, there is a constantly decreasing speed of contacting and, hence, a constantly decreasing rate of combustion and decreasing flame temperature. By this time, the velocity of the coal particles has been decreased to about that of the gases through the burning zone (probably between 2000 and 4000 ft. per min.) and, at this reduced speed, they continue to travel back through the kiln burning just as rapidly as their volatile gases can be distilled and brought into contact with oxygen, to complete the second stage of combustion.

By the time the second stage of combustion has been completed, the remaining coke particles have traveled well back into the kiln, a considerable length of flame has been produced and the atmosphere in the kiln contains a constantly decreasing proportion of free oxygen and a constantly increasing proportion of the inert products of combustion and nitrogen. Contacting of the combustible with oxygen becomes increasingly more difficult at the very time when it is desirable to complete combustion rapidly.

Under these adverse conditions, the third stage of combustion begins and is continued at a progressively slower and slower rate. It may be carried to completion at some undetermined point well back beyond the burning zone or may not have been completed even when the gases reach the back end of the kiln. It is usual to find a small percentage of carbon monoxide in the exit gases, a definite percentage of combustible is usually found in stack dust, and a burning "plume" at the top of kiln stacks is not unknown. Plants having short kilns and dry process plants where the kilns are forced are the worst offenders, but even wet process plants with long kilns can seldom show perfect combustion.

The usual methods of operating control add to the inefficiency of combustion. The "burner," usually without scientific instruments of control other than a pair of burning glasses, frequently can control only kiln speed and rate of coal feed and, occasionally, the volume of primary air. The large volume of secondary air is drawn into the kiln by the draft and is entirely outside of his control. He judges kiln conditions from the character of the flame, from the location of the "raw" and from an occasional sample of clinker. His flame temperatures are only slightly above the clinkering temperature and his only safety controls are to put in more coal or to slow up the kiln. He usually does both at frequent intervals. He must burn sound clinker. Combustion efficiency, if considered at all, is entirely secondary.

This method of burning and of kiln control is in use in a majority of the kilns of the cement industry. Burning zones from 30 to 50 ft. long, although the writer has seen zones fully 70 ft. long, with constantly fluctuating burning conditions, are produced. The methods are inefficient and unscientific. Their one excuse is the production of high quality clinker resulting in high quality cement.

Long vs. Short Burning Zones

Many cement operators claim that a long burning zone is essential for the proper burning of cement clinker. Under the conditions outlined above—the usual conditions in cement kilns—a long burning zone *is* necessary. The clinkering process is a chemical reaction which takes place at a definite temperature after the absorption of a definite amount of heat. The time required is dependent on the rate of heat absorption and the time required to reach the clinkering temperature. With the usual method of burning pulverized coal, zone temperatures are not much higher than the clinkering temperature. With this slight temperature difference, the rate of heat transfer is low and considerable time is required for the "load" to absorb the correct amount of high heat and to reach the clinkering temperature. Hence a long burning zone is necessary.

With more efficient and scientific methods of combustion and resulting higher flame temperatures, burning zone temperatures are considerably increased, the rate of heat absorption is increased and the necessary length of burning zone is decreased. There is also a large increase in the safety factor between the burning zone temperature and the necessary clinkering temperature. A short burning zone of high temperature has greater clinkering capacity and produces more uniformly burned and higher quality clinker than a long burning zone of comparatively low temperature.

Serious injurious effect of high flame and burning zone temperatures on the coating and lining may be feared by those not familiar with operating under these conditions. With correct design and control, quite the opposite results have been secured. High zone temperatures produce a more dense and uniform, but not a heavier, coating which gives greater protection to the brick and usually doubles or trebles lining life.

Practical Advice

Practical combustion methods for producing more efficient and scientific burning in the rotary kiln have been indicated by the theoretical discussion earlier in this series of articles. The practical application of these theories to the burning of cement clinker is

*Part 1 was published in Rock Products for July, 1934, pages 38 and 39; Part 2, September, 1934, pages 36 and 37; Part 3, November, 1934, pages 24 and 25; Part 4, January, 1935, pages 18-21; Part 5, March, 1935, pages 32 and 33; Part 6, May, 1935, pages 32 and 33.

a problem which requires a thorough knowledge of the details of cement manufacture combined with a considerable knowledge of chemistry, physical chemistry, physics, mechanics, thermodynamics and allied branches of engineering. The problem of design is separate and distinct for the conditions at each individual plant and frequently for each individual kiln.

Such burning systems must be designed to fit:

(1) The kiln—its diameter, length, pitch and speed; its physical and mechanical condition; its draft; its internal construction and the type and character of lining.

(2) The mix—its chemical composition, moisture content and fineness; its coating and clinkering characteristics and its tendency to form either mud or clinker rings or both.

(3) The fuel—its analyses both proximate and ultimate; its physical and chemical characteristics; its fineness and moisture content; its burning characteristics and the character and fusion temperature of the ash.

(4) The air supply—average barometric pressure and average humidity; possible and practical sources of heat for preheating and probable and desirable temperatures; methods of handling; possible and probable dust inclusions and the possibilities of doing other useful work, particularly increased cooling of clinker, by the air supply.

It is essential for proper control of burning and of kiln operation that each kiln be equipped with a completely separate burning system including the air supply.

With the above details known or definitely determined and with the desirable clinkering capacity established, the burning system must be designed to fit and to produce the highest efficiency possible under the particular conditions. Such burning systems should provide:

(1) Definite mechanical control of from 90% to 100% of the air necessary for combustion of the fuel.

(2) Definite mechanical control of the fuel supply.

(3) Preheating of the fuel and of the air for combustion to the maximum temperatures desirable under the conditions of mix, of fuel, of clinker and of cooling.

(4) Definite mixing of the fuel with the desirable percentage of total air into a homogeneous mixture prior to admission to the kiln.

(5) Where separate primary and secondary air supplies are desirable, the definite inclusion of the secondary air into the air stream either directly prior or directly after admission to the kiln.

(6) Admission of the fuel and air supplies to the kiln at low velocities but sufficiently high to prevent back-firing with the particular fuel and under the particular temperature of the fuel-air mixture.

(7) Definite provision for maximum agitation of the fuel and air streams both before and after admission to the kiln.

(8) Definite provision for control of factors affecting combustion for variations in kiln capacity, including ample provision for overloads.

(9) Provision for adjustment of the flame and its location and direction to prevent scouring and similar injurious effects.

(10) Provision of definite control of the kiln draft, preferably under control of the "burner."

Definite mechanical control of the air for combustion and of kiln draft eliminate the variations in air supply and in burning and kiln conditions resulting therefrom. The exact percentage of the total air supply to be handled mechanically depends on local conditions, particularly the condition of the kiln nose and hood. Usually, it is desirable to maintain a slight draft (0.01 in. to 0.03 in.) at the hood and to draw sufficient air around the nose to keep it cool. About 10% of the total air for combustion is usually sufficient for this cooling and this amount of air may be admitted in this uncontrolled manner without seriously affecting the efficiency of combustion. The small percentage of excess air (about 5%), desirable with this method to insure complete combustion, preferably should be admitted under control. On kilns equipped with seals on the firing end, the entire air supply should be under mechanical control.

The use of preheat for both the fuel and air has been discussed fully for each of the fuels in general use. Its objects are:

(1) To save sensible heat which otherwise would be at least partially lost.

(2) To decrease the time required for the heating stage of combustion and bring the flame close to the nose of the kiln.

(3) To increase the speed of the combustion reaction and shorten the burning zone.

(4) To increase flame and burning zone temperatures.

Control of Fuel Feed and Air

The amount of preheat to be used must be determined in each case from the conditions and from the amount of heat available. In the usual kiln and rotary cooler installation, it is entirely practicable to use air preheated by passage through the cooler. With the air through the cooler under mechanical control, it is usually possible to secure considerable improvement in the cooling action and to at least approach the results from more efficient types of coolers. The definite degree of preheat which it is practicable to carry in any particular case will depend on the fuel; on the point at which the fuel and air are combined; on the clinkering and coating characteristics of the mix and on the quality of the lining used in the burning zone.

Definite mechanical control of the fuel supply is in universal use in one form or another. In many installations where coal is used as fuel, particularly if single flight, screw conveyor feeders are in use, there is a pulsating action in the coal feed and a resulting pulsating action in the flame. Such pulsating action is distinctly inefficient with any system of burning since the air supply remains constant while the fuel-air mixture varies between excess fuel and excess air with each pulsation. The coal supply should be fed continuously and at a uniform rate over as much of the width of the air pipe as may be possible in each installation. With fuel oil and natural gas, this difficulty rarely occurs. Continuous and regular fuel feed is essential for efficient combustion in rotary kiln practice.

Definite mechanical control of both the fuel and air supplies, particularly when coupled with draft control, eliminates the greatest single variable from rotary kiln operation and makes it possible and practicable to operate a kiln with considerable accuracy. Under these positive controls, kilns can be operated over long periods, frequently as long as several days, without adjustment of the controls and without operating attention, except for occasional inspection. Continuous, full-speed, kiln operation results in increased total capacity and reduced fuel consumption and is reflected in increased lining life. When coupled with the installation of practical indicating and recording instruments for combustion control, it makes it possible to place cement kiln operations in the hands of skilled engineers operating from a central control room with limited visual inspection by a greatly reduced kiln room force.

Definite mixing of the fuel and primary air prior to admission to the kiln is necessary to promote instantaneous and complete combustion in the burning zone. A homogeneous mixture of fuel and air is difficult to secure and almost impossible to maintain for any distance in a supply pipe. Coal is much heavier than air and gas is much lighter. Either tends to separate from a mixture, particularly into the slower velocity air near the periphery of the supply pipe and along the sides of any bends or curves, however slight. This tendency must be guarded against in design and final, intensive mixing should be made just prior to admission to the kiln. Fuel oil, because of its liquid nature must be handled separately from the air supply up to actual admission to the kiln.

Heavy concentration of fuel in any part of the flame in the kiln must be carefully guarded against. Where such concentration occurs, a very noticeable reducing action results. Should this reducing atmosphere strike either the load or the coating, an appreciable reduction of the oxides, particularly of the ferric oxide, results and unsound clinker, in greater or less proportions, is burned. (Private notes and reference No. 76.) This difficulty occurs particularly when coal is used as fuel and results from the accumulation of coal at the bottom of the

flame. Once thoroughly understood, this condition is not hard to overcome.

The use of primary and secondary air supplies is a question which must be decided for each installation. In some cases, particularly on small kilns, it is more practicable to use a single air supply. In other cases, it is desirable to convey the coal some distance, and primary air can be used advantageously for this purpose. On large kilns, the volume of air to be handled is so great that two air systems are desirable, both on account of handling and to simplify mixing the total air with the fuel. Where secondary air is used, this air supply should be mixed with the primary fuel mixture either immediately before or immediately after admission to the kiln and the mixing should be so designed as to increase agitation in the kiln.

Agitation in the burning zone has been discussed in several phases earlier in this series of articles. It is a means of essential importance in promoting rapid contacting of the fuel and oxygen through removing the products of combustion from the surface of the fuel and replacing these inert gases with air containing free oxygen. The more violent this agitation, the more instantaneous is the combustion reaction and the higher the flame temperature. In rotary kiln practice, it is essential that agitation shall be under control and that it shall be so designed as to prevent any scouring action of the flame on the coating. Due to the construction of the kiln nose, it is usually necessary to introduce both the agitation and the control before admission of the air to the kiln.

Velocity of admission of the air and fuel streams to the kiln is one of the most important problems in burner design. This velocity should be low to give as much time as possible for combustion; to decrease the length of kiln required for the several stages of combustion; to increase the rate of the combustion reaction and hence the flame temperature and to decrease the power required for air handling. On the other hand, it must be high enough to prevent any possibility of back-firing, with the particular fuel in use and under the mixture and temperature conditions previously determined, for minimum kiln capacity. The velocity of flame propagation is the determining factor. With this velocity determined, the minimum entering velocity is known. It is usual to design burners on the basis of minimum kiln capacity for an entering velocity from 30% to 50% above the velocity of flame propagation. The problem of streamline or turbulent flow of the air does not enter the design of either the piping or burner since any practicable air velocity will be sufficiently high to be in turbulent flow.

The percentage of ash in coal has a large effect on the velocity of flame propagation; an increase in ash content decreases the velocity. Inclusions of clinker dust in the air for combustion have an additional effect on coal and a similar effect on fuel oil and on natural gas. Roughly, a one per cent increase in inert solid dust will decrease the velocity of flame propagation one foot per second.

Conclusions

No attempt has been made in this series of articles to cover completely either the theory or practice of combustion in the rotary cement kiln. The subjects are too large and the details too technical to be of interest to the reader who is concerned with practical results. A list of references is added for those who are interested further in the details of either theory or practice. These references have been culled from a much larger list, and it will be found that the information and data can usually be applied to some phase of the problems discussed. All of the references have been consulted in the preparation of these articles and acknowledgment is made of much valuable assistance. The writer's experience with combustion problems in the rotary cement kiln has been the basis of the article, and this experience has been necessary to interpret the data from other industries into the requirements of the cement industry.

The aim of the article has been to call attention to the fact that combustion methods in general use in the cement industry are antiquated; that, while these methods produce quality cement, they also produce enormous waste; that modern combustion methods will greatly reduce this waste and will also produce cement of even higher quality, at this reduced fuel consumption. The application of the combustion methods to the rotary kiln is not experimental. They are in quite general use on gas-fired kilns and have been in use for a number of years on coal-fired kilns in several plants.

It is hoped that this article may point the way for the cement industry to secure the economies possible through more modern combustion methods. These economies are:

(1) Quality. An increase in tensile strengths of cement between 25 and 75 lb. per sq. in.

(2) Fuel economy. A reduction in fuel consumption between 150,000 and 500,000 B.t. u. per barrel of clinker produced.

(3) Kiln capacity. An increase in clinkering capacity between 10 and 25%.

(4) Maintenance. An increase in burning zone lining life between 100 and 300%.

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(THE END)

As They Do It in India!

A PROPOSAL to merge all Indian cement factories into one all-India company was made at Bombay on August 9 last. Hitherto the leading factories have combined only for marketing purposes, but now there will be unitary control of production in matters such as the procuring of raw material, process of manufacture and technique and general policy.

It is hoped to reduce freight charges through the allocation of territories to each factory. It is expected to eliminate foreign competition and to make Indian cement self-sufficient. It is proposed that each factory should transfer its works to the new company in return for shares at the rate of 60 rupees for each ton producing capacity. The scheme for unitary control of output is generally popular.

The capital invested in the Indian cement industry by companies is more than £3,750,000.

One Cement Dust Suit Closed—Another Begun

Cowell Portland Cement Co., Cowell, Calif., has surrendered to successful suits by adjoining farmers and recently placed a contract with the Western Precipitation Co. for an electrical dust-precipitation installation. After years in the courts a final decision gave the company until May 1, 1936, to make a dust collection installation or cease operation forever. The court also ordered the plant closed June 1, but allowed reopening November 15 of this year until May 1 next year.

Wabash Portland Cement Co., Osborn, Ohio, is the latest company to be subjected to a dust suit. A local farmer claims damages of $25,250.

Cement Plants Alternate Operation

UNABLE to operate continuously because of lack of orders—like many others—the North American Cement Corp. and the Alpha Portland Cement Co. alternate operating periods so as to avoid complete demoralization of the small communities around Catskill, N. Y., which depend almost wholly on these plants for sustenance.

Cement for Farm Market Campaign Highly Successful

Ash Grove Lime and Portland Cement Co., Kansas City, Mo., is conducting an advertising campaign by use of relatively small space in all midwest farm papers, which, according to *Advertising Age,* has provoked highly satisfactory response. The company launched its farm campaign in August, with copy featured by employment of cartoons and "ballooons." Uses and advantages of concrete on the farm provided the theme of each cartoon in the current series. "Conversation" of animal characters was shown by means of the balloons. The advertisements depicted the value of cement for farm buildings, building foundations, fence posts, feeding floors for hogs, and other purposes, and pointed out that cement furnishes protection against termites, windstorms, fire, rats, and rust. Each advertisement was 2½ in. on two columns. The series was conceived and developed by Richard Slater, Ash Grove's advertising manager, with coöperation of the art and production departments of Potts-Turnbull Advertising Co. Readers were urged to contact local Ash Grove dealers, or to write the company for further details. Each suggestion has produced a large volume of replies. Shortly after the series started, requests began to arrive from dealers for small pieces reproducing the advertisements. Blotters were then prepared. For several years cement makers have relied largely on association advertising of cement to the farm trade. Until the present series began in farm papers, the Ash Grove company had confined its advertising almost entirely to contractors' publications.

Views of the new dredge of the Louisville Sand and Gravel Co.

Louisville Sand and Gravel Company Completes New Plant

New Company and New Plant Began Operations in July

THE LOUISVILLE SAND AND GRAVEL CO., Louisville, Ky., is a new concern whose plant was completed and put in operation in July. The principal owner is Steve Click, formerly with the Herbert Sand and Gravel Co., Nashville, Tenn., where he had many years' experience in river dredging operations.

The plant is intended to handle a maximum of 400 tons per hour, and is designed to produce two sizes of sand (mortar and concrete) and two sizes of gravel. Mortar sand is minus 8-mesh, and concrete sand is minus ¼-in., and the gravel is 1-in. and 2-in.

Storage bins and stock piles and loading bins are located on the deep canal just south and adjacent to the Ohio river at the foot of 14th street. The 12-in. dredge boat is operating at the present time at a point 15 miles downstream near Kosmosdale, Ky.

Dredge

The dredge (formerly a government boat) has a steel hull and wooden cabin and is 110 ft. long by 26 ft. wide by 6 ft. deep. It is steam-driven. A coal barge of approximately 800 tons' capacity, sufficient to operate the dredge and screening and washing plant throughout the season, is fastened directly to the dredge and coal is fed to the boilers by wheel-barrow. Steam is developed in twin Scotch marine type boilers.

Steam is supplied under 140 lb. pressure to a Houston, Stanwood, Gamble horizontal steam engine. The steam engine, through the medium of a 19-in. belt, drives the 12-in. Ellicott cutter type pump. The pump operates with a 12-in. suction and 12-in. discharge, the suction line being mounted on a 50-ft. A-frame.

Washing Plant

A sand and gravel bed of 45 ft. average thickness is being worked. The screening and washing plant is located directly in the center of the boat on top of the cabin. The discharge pipe from the pump comes into the discharge box vertically, causing a surging discharge action. The discharge passes down a 12-ft. by 3-ft. by 2½-ft. discharge chute of 10-gauge iron inclined 15 deg. from the horizontal, toward the stern of the boat. The bottom of this chute consists of a bar screen of longitudinal bars ½-in. wide, spaced 3/16 in. The finer sand and wash water passes through the openings to the sand screens directly below. Two gravity sand screens, one with ¼-in. openings and the other with ⅛-in. openings are mounted below the bar screen, the ¼-in. screen being above the other and parallel to it. The screens are 25 ft. long by 5½ ft. wide and dip 30 deg. downward toward the bow of the boat.

The screens are wholly enclosed, the lower end of the housing being equipped with a flip-flop gate to control the flow of sand to the barges. The sized sand is carried out through 12-in. pipe to be loaded to the barges. One 40-ft. pipe extends outwards at right angles on each side of the boat with an angle of depression of 7 deg. Water pumped by the dredge pump and water from

the washing pump concentrate at the lower end of the sand screens and wash the sand out the pipe. There are "flip-flop" chutes (flap valves) on the ends of the pipe to control the loading of the barges. The flip-flop gates in the screen housing at its lower end, where the pipe lead out, make it possible to send any desired proportion of the two sizes made through either pipe to the barges.

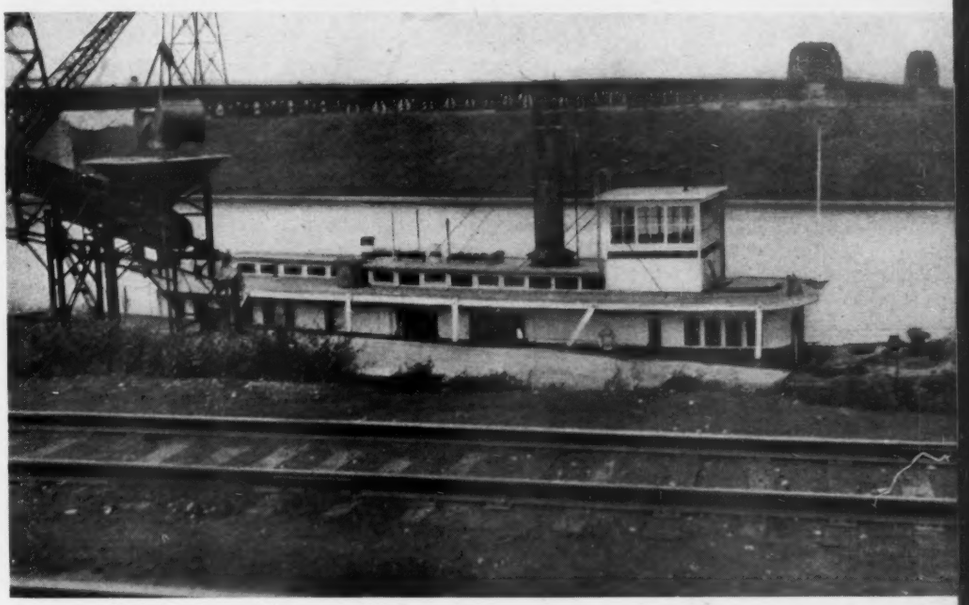
The coarser material which does not pass the bars, is dewatered in passing over the bars, and passes to a triple-deck, 5- by 12-ft., Robins Gyrex screen, belt-driven by a small steam engine. This screen is equipped with 2-in. mesh on the upper deck, 1-in. on the middle deck and ¼-in. on the lower deck. A 6-in. Gould pump driven by a small vertical steam engine by means of a 6-in. belt supplies the wash water under 35 lb. pressure. Pipes 4 in. in diameter, from the 6-in. main, perforated, pass transversely across the screen decks. Gravel retained on the 2-in. mesh passes through a chute back to the river. Gravel passing the 2-in. but retained on the 1-in. goes through a "pants-leg" chute to two belt conveyors to barges on either side. Gravel passing the 1-in., but retained on the ¼-in. also goes through this system. A hinged gate valve controlled by an outside lever makes it possible to put any desired amount of either size in either barge, although provision is made on regular run to permit each size to fall on its belt and go to the proper barge. Material passing the ¼-in. deck goes directly below to the sand screen described.

The two 22-ft. center to center 20-in. Robins belt conveyors below the "pants-leg," are placed end to end, in the center of the boat and extending outward over the sides of the boat for loading. These belts are driven by a vertical steam engine.

Four barges are generally loaded at one time, coarse sand and coarse gravel on the port side, and fine sand and small gravel on the starboard side. Due to the use of flip-flop gates there is great flexibility of operation. When the river run of material is in excess in any one of the four sizes, the surplus is not wasted, as the flip-flop gate takes care of all excesses except that of 2-in. plus material, which goes back into the river.

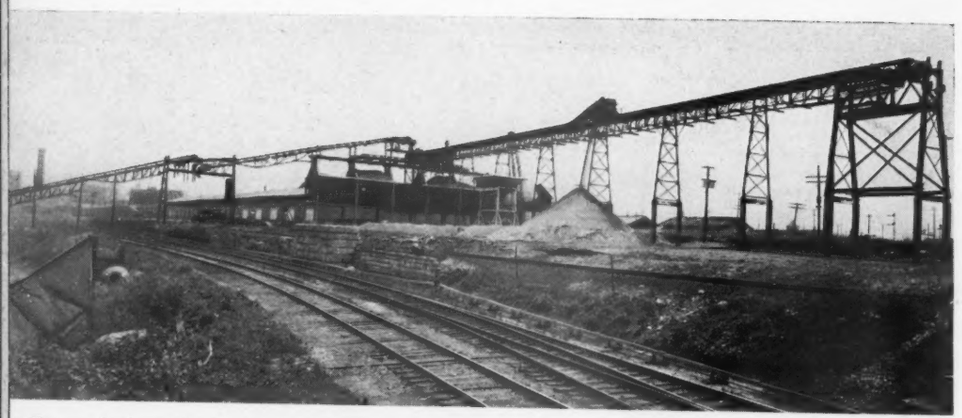
Hauling

The plant is equipped with ten 400-ton all-steel barges, 26 ft. by 100 ft. by 6 ft. 6 in. in depth. Generally three or four are towed at once to the loading bins and stock-piles at Louisville. The tow boat *Steve Click, Jr.*, is driven by twin screws powered by quadruple expansion engines. The boat is 22 ft.



From top to bottom: "Pants leg" housing for loading each conveyor with gravel, as desired; one belt out to right, other to left: Tow boat "Steve Click, Jr." and unloading clam shell: Barges and tow boat at plant terminal: Conveyor system and storage bins

Office building, bins and truck scales



General view of plant and conveyor system—Batcher near center of ground storage

Above: Steel bins under shuttle conveyor. Below: View over top of bins

by 120 ft. and has a steel hull, Model Bow type, and has single deck. It is operated by steam from a water-tube boiler under 250 lb. pressure. The boilers are coal fired.

Stock-Piling

The barges are unloaded by a 1½-yd. Owens clam (gasoline driven) into a hopper feeding the first belt going up the incline to the bins. This hopper is 12 ft. by 12 ft. and is 6 ft. deep. The hopper loads directly on a 42-in. Goodyear belt 125 ft. centers, driven by a 25-hp. General electric motor at a speed of 120 lin. ft. per min.

Provision is made to permit loading from the end of this belt directly into railroad cars passing below. Material to be taken up to the bins passes a second 42-in. belt, 140 ft. centers, driven by a 40-hp. G.-E. motor and traveling at 122 ft. per min. This conveyor passes over and parallel to the truck-loading bins. These bins are of all steel construction with hyperbolic cross-section, and have an overall length of 120 ft. They consist of six compartments, each of 400 tons capacity. A shuttle belt, 69 ft. centers, driven by a 7½-hp. G.-E. motor, above the bins, operates in both directions. A "pants-leg" chute equipped with a flip-flop gate transfers the sand and gravel to the shuttle or to the overhead conveyor.

The overhead conveyor extends outward 269 ft., at right angles to the axis of the bins, 40 ft. above the ground for stockpiling. A Stephens-Adamson three-way tripper travels on this conveyor to dump the aggregate wherever desired. The overhead conveyor is driven by a 25-hp. G.-E. motor and travels 125 lin. ft. per min.

All belt conveyor equipment of the plant is Stephens-Adamson, and the travel of the belts is governed to take care of the flow of material at any set time.

A 1¼-yd. gasoline-driven Koehring crane is used in loading from stock-pile directly into trucks or railroad cars. The plant is equipped for shipping by truck, rail or water. It is also equipped with a 40-yd. Blaw-Knox batching hopper, divided equally into two compartments, for proportioning aggregate for contractors. A new, modern office building and weighing room has been built of red-face brick. A Fairbanks-Morse scale of 30,000 lb. capacity (type S. T. M.) is used for weighing trucks.

Sand and Gravel Producers Safety Contest Winners

A BETTER SAFETY RECORD in 1934 than in 1933 was made by the producers of sand and gravel who participated in the sixth annual safety contest conducted by the United States Bureau of Mines in coöperation with the National Sand and Gravel Association. The combined accident-frequency rate and the combined accident-severity rate for the enrolled companies were, in fact, more favorable in 1934 than in any other year since the safety competitions were organized in 1929.

Two safety trophies were awarded as a result of the contest, one to a company in Pennsylvania that won first place among plants that worked 100,000 or more man-hours during the contest year, and the other trophy to a company in Michigan, whose plant established the best safety record among plants that were in operation less than 100,000 man-hours. Both trophies are provided by ROCK PRODUCTS to be awarded annually to the companies that achieve the greatest success in the prevention of accidents.

The contest covered accidents and man-hours worked by all employes at the participating plant who were employed by the same company; it included work up to the point of delivery of the material directly to the consumer or to an independent agency of transportation—in other words, to the

point of relinquishment of control of the material by the producer. The purpose of the contests is to aid in the promotion of safety among the employes and in the reduction of accident costs to the companies. Through the development of friendly rivalry among the various plants and among the employes of each individual plant, interest in the prevention of accidents is sustained.

Awards and the relative standing of the various plants are based upon a statistical compilation by the Bureau of Mines of accident reports and employment reports furnished by the competing companies. Company reports are summarized at the close of each year, and the summaries are submitted to each company concerned for certification as to the accuracy of the summary and the completeness of the company's reports from which the summary was prepared. The position of each plant is determined by its accident-severity rate; that is, the number of days of disability resulting from accidents for each 1000 man-hours of work done by all employes at the plant.

The Van Sciver plant, Morrisville, Penn., of the Warner Co., won the trophy for plants working more than 100,000 man-hours. This is a lake-deposit plant and it was operated 116,019 man-hours in 1934 without a lost-time accident. In addition to winning the trophy in the high unit for the past year, it won the trophy in the low unit in 1933 and the trophy in the high unit two previous years, 1931 and 1932. This plant has worked nearly one-half of a million (479,032) man-hours during the past four years without an accident causing loss of time to an employe.

The Oxford plant, Oxford, Mich., of the American Aggregates Corp., won first place in the low unit (less than 100,000 man-hours), without a lost-time accident. Sand and gravel are obtained by the Oxford plant from a dry-bank deposit. In 1933 this plant won the trophy in the high unit by working 167,814 man-hours with a record of nine lost-time temporary accidents causing 136 days lost time, the accident-severity rate being 0.810.

Of the 39 plants enrolled in the 1934 contest, 24 had no lost-time accidents during the year.

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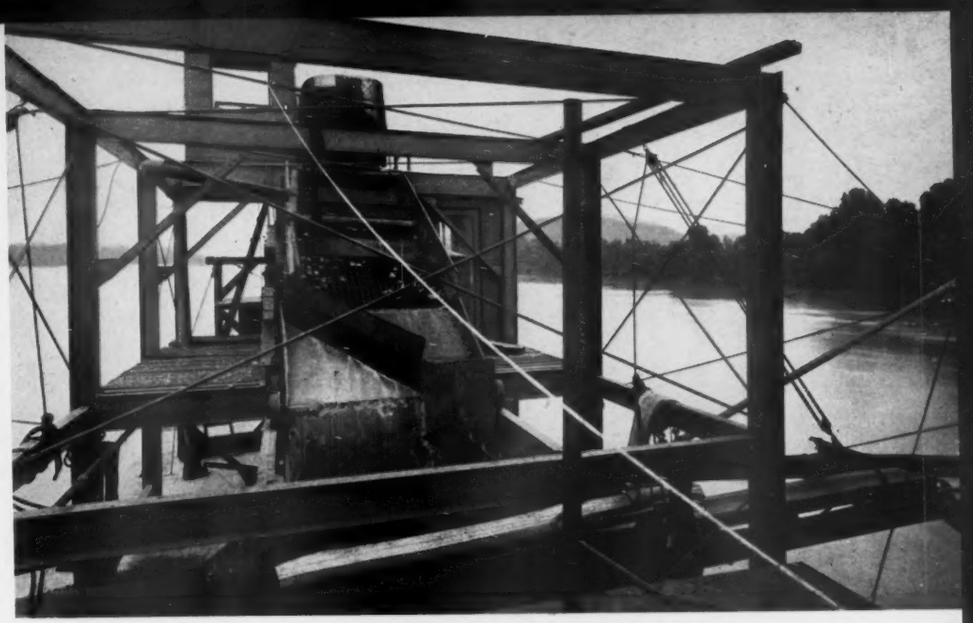
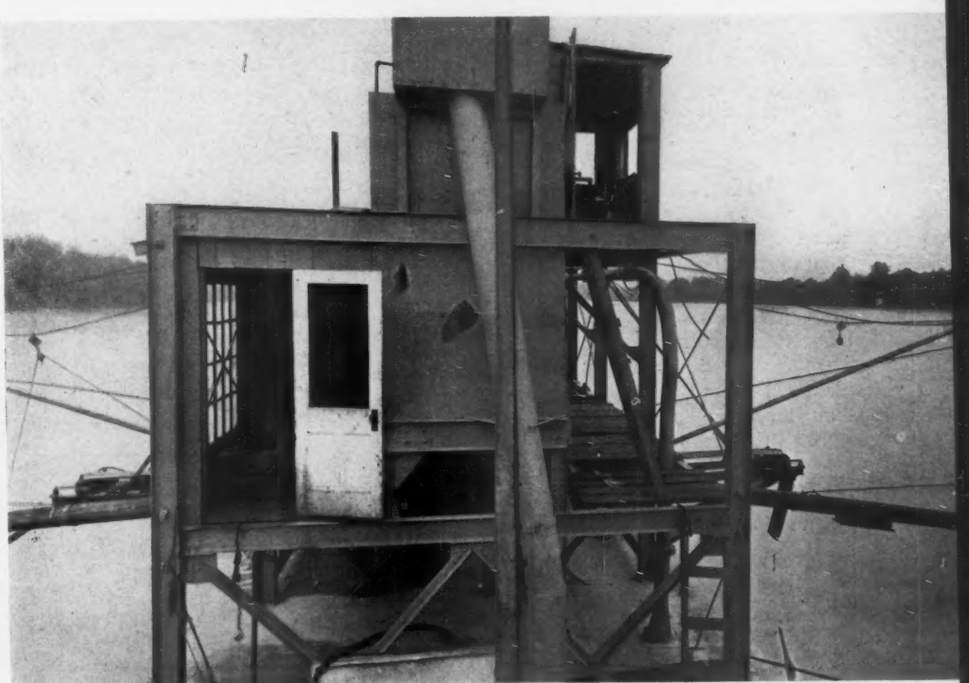
Will Change From Bank to Dredge Operation

Schmidt Bros. Sand and Supply Co., Bedford, Ohio, has purchased complete an all-steel suction dredge which has been in use by Cornell University for deepening Beebe Lake on the campus. Within the next year or two the company's pit will be changed over from shovel to dredge operation. The dredge has a 10-in. Morris heavy-duty manganese-steel dredging pump, driven by an electric motor, and other equipment, on a two-sectional steel hull, each section being 9 ft. wide by 45 ft. long by 5 ft. deep.



View from front end of dredge, showing screening and washing plant, sand conveyor on right



Above: View from stern of Louisville Sand and Gravel Co. dredge. Below: Another interior view showing belt drive from steam engine

Crushed Stone Industry Shows Growing Activity

Brings Plant Up-to-Date

Blue Rock, Inc., Greenfield, Ohio, has added to plant facilities recently washing equipment, batcher and bins and a 20-ton locomotive crane for serving the bins and for loading from storage.

New York to Florida

S. S. Elizabeth, of the Eull Steamship Line, recently arrived at Jacksonville, Fla., with a cargo of 5000 tons of crushed stone from New York City. This was said to be the largest ship to pass the drawbridge on the St. Johns river in the last 10 years.

Adds Batchers

France Stone Co. (Toledo, Ohio) has recently added a Blaw-Knox batching plant to its Monroe, Mich., operation. Two steel storage tanks, each 18 ft. in diameter and 15 ft. high, are used to hold two sizes of crushed stone and one of sand. A partition in one of the bins provides separate storage for the small-sized stone and for the sand. A gravity chute is provided from the coarse stone bin to the batcher under the other bin, which, of course, leaves some waste, or dead storage, in the coarse stone bin. The aggregates are brought to the batching plant in bottom-dump railroad cars, which dump to a track hopper. This hopper is emptied into the storage tanks by a 42-in. belt with 36-in. buckets—at a height of 57½ ft. A Howe scale provides weighed batches to motor trucks. Another recent addition to the Monroe plant is a New Holland roll crusher for recrushing to finer sizes.

◈ ◈ ◈

France Stone Co., Toledo, Ohio, has taken over the Daniel Evans Stone Co., Marion, Ohio, and is operating it under the name of **Marion Stone Co.** A Marion, 450, gas-electric shovel was added last spring. It is equipped with a 1¼-yd. bucket and is used for stock piling and general service around the plant. Vibrating screens now do all the sizing.

Changes Quarry

Blanton Stone Co., Frankfort, Ky., has recently made a number of improvements and changes, chief of which is a change to truck operation of the quarry instead of the use of cars and locomotives. Additional screening facilities have been provided by a 4x10-ft. Robins double-deck Gyrex screen, used to scalp stone from the secondary crusher and return oversize to a 2-ft. Symons cone crusher. A 4x5-ft. Tyler double-deck vibrating screen and another 4x10-ft. double-deck Robins Gyrex provide facilities for additional sizes of crushed stone.

Reopened for Rip-Rap

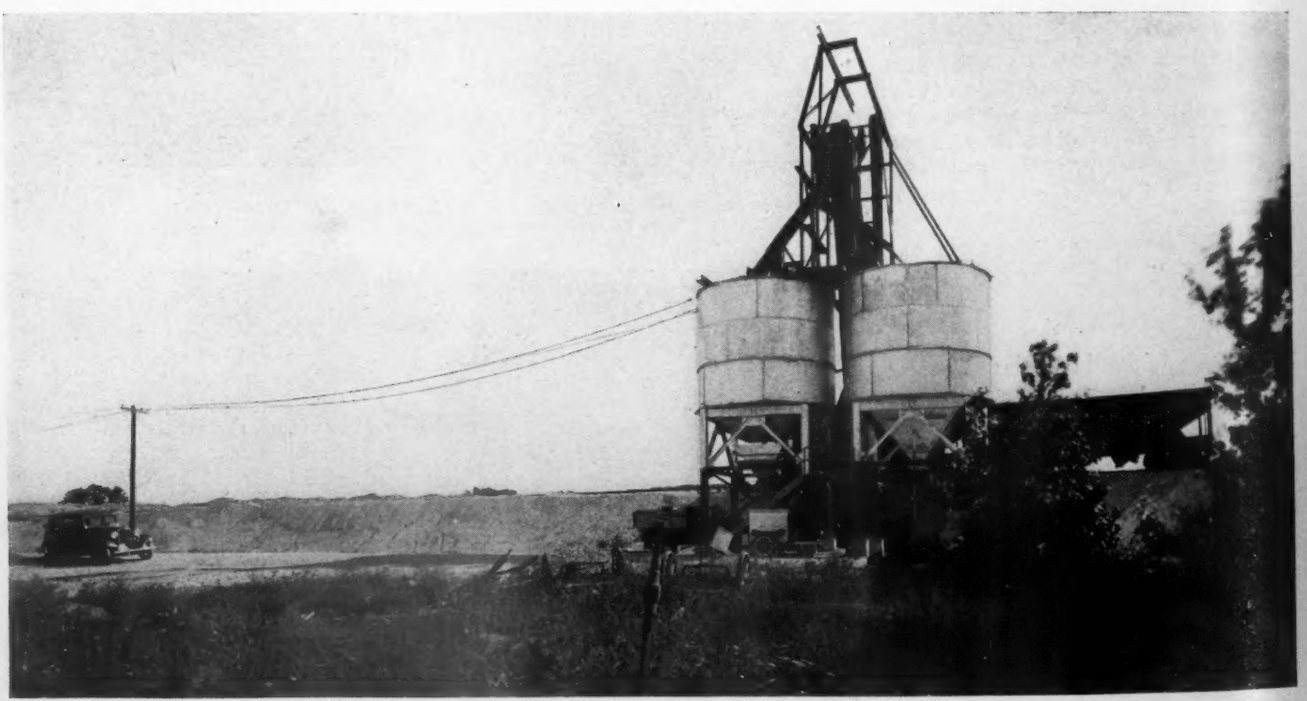
Ormand Quarry, West Riverside, Calif., has been reopened by Rohl and Connolly, contractors, for rip-rap on the Long Beach breakwater.

Stone from Toledo City Jail for County Roads

AFTER much controversy during which the France Stone Co. offered its product, it appears that county commissioners at Toledo, Ohio, will buy crushed stone from the city jail. The France Stone Co. offered to sell the crushed stone, or to allow the county to put its own WPA labor in its quarry to produce its own requirements.

Cars to Trucks

Cerulean Stone Co., Cerulean, Ky., has recently replaced its industrial railway track, locomotives and cars with motor trucks. This involved construction of a broad, smooth roadway from the quarry to the crusher, to replace the former incline. As one of the views shows, the company believed in a good job of road building. The trucks selected to do the quarry hauling were four V-8, 3-ton, end-dump Fords and one International. All truck bodies were especially built with double flooring, the upper one designed to be readily replaced. The bodies have 36-in. hinged tail gates. Quarry loading is by means of a 1¼-yd. Marion all-electric shovel. The haul from the present quarry face to the crusher is about 400 ft. Other changes and improvements include installation of a 3x16-ft. Symons vibrating screen in place of a cylindrical, revolving screen, thus providing head room for adequate storage. The plant was designed for rail shipments only, and it was found that truck shipments would



New batching plant of the France Stone Co. at Monroe, Mich.

Cerulean Stone Co. new quarry face; quarry roadway completely surrounds old water-filled quarry

require more storage facilities. The change in screening devices nearly doubled the bin capacity without changing the plant design.

Prison Makes Rock for WPA

UNDER the rules and regulations of PWA, prison-made construction materials were ruled out. When PWA Administrator Ickes lost his battle for public works to WPA Administrator Hopkins, producers of crushed stone, sand and gravel also lost out in more ways than one, for WPA has no objection to prison-made materials. In Illinois, the state prison at Joliet will furnish crushed stone *free* for WPA highway improvements.

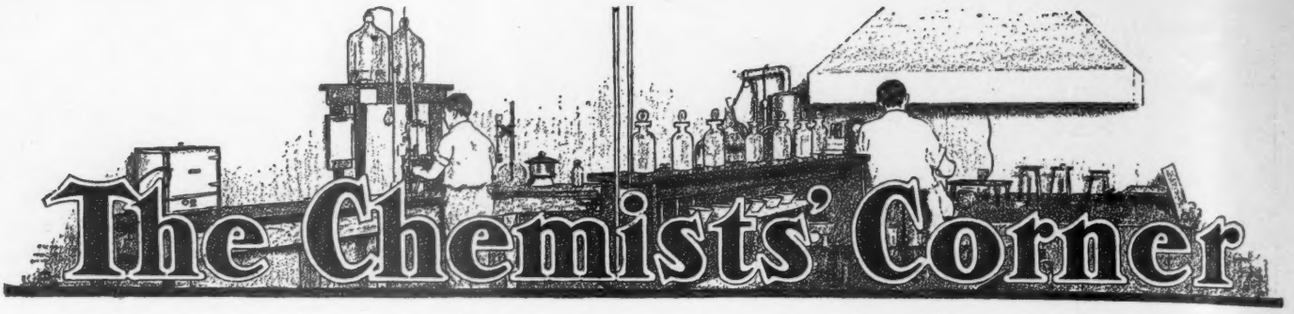
Brand New

A. J. Clementz's Sons, Massillon, Ohio, have just completed a new sand and gravel plant near Beach City, Ohio, on the Baltimore & Ohio R.R. A bank deposit 40 ft. thick with 4 ft. of overburden is being worked. A 1-yd. steam shovel loads directly into a 5-yd. field hopper. This hopper feeds to a 24-in. Robins belt conveyor, 180-ft. centers. The conveyor is extended as the shovel moves away. This conveyor carries the material to a 4x8-ft. Bartlett-Snow rotary screen, where the plus 2½-in. size is screened out and crushed by a Telsmith H5 gyratory crusher. The throughs and crushed gravel are carried back to the main screen on another 24-in. Robins belt conveyor, 160-ft. centers. The finished material then passes through a 7x20-ft. Bartlett sizing screen with three barrels (two jackets), where five sizes are made. At the present time the sand is wasted. A Weiman 5x5-in. pump, driven by a 40-hp. G-E electric motor, supplies the wash water to the screen. The plant is equipped with four 130-ton Blaw-Knox steel cylindrical bins.

New small trucks with extra high tail gate used for hauling stone from quarry to crusher, Cerulean Stone Co.

A 25-hp. G-E motor drives the crusher and primary screen; a 15-hp. G-E drives the field conveyor; a 20-hp. G-E drives the inclined 160-ft. conveyor, and a 15-hp. drives the sizing screen. The plant is designed to eventually produce 100 tons per hour.

A. J. Clementz's Sons new sand and gravel plant at Beach City, Ohio



A Grain Size Separator Calculator

By C. E. Heinz,
Metallurgist, Joplin, Mo.

A SIMPLE NOMOGRAPHIC CHART has been constructed to calculate the effective mechanical work of a sizing unit making two products. The original purpose was to place in the hands of mill men a practical working tool that would assist them to better their screening and classifying operations. A simple system of sampling and of testing the samples for grain size was also included in the study.

Only two samples of the sizing unit are taken, the finished product and the product rejected. The feed to the sizing device is not used. The sizing device may be a screen of any type, a bowl, rake or drag classifier, air separator or most any kind of a device that is intended to make a separation of grain sizes, if only two sized products are being made.

Plant practice or industrial specifications for a finished product usually mentions the percentage by weight of a certain grain size in the finished material, that will be tolerated. For example, an admixture for a certain purpose may be required to pass a No. 150 sieve and 10% by weight may remain on the No. 200 sieve.

In plant practice, the "tolerated grain size weight per cent" must be watched very closely to be sure the finished material will pass inspection. The "weight per cent" figure of the tolerated grain size in the finished material also becomes an important base figure when making a study of sizing unit costs or efficiency.

As we are usually most interested in the finished product of any sizer, the usual formulas for calculating the efficiency of a sizing unit are not used. A practical working formula is used that is based upon the weight per cent of the "true fines" found in the finished product and the product rejected.

Let x be the weight per cent of "true fines" in the oversize and y be the weight per cent of "true fines" in the finished material, then the "efficiency figure," base number, index number or "yardstick," the number found, may be called

$$E = 100 - \left(\frac{100\,x}{y}\right)$$

The chart shows that when there is no "oversize" in the finished material and no "undersize" in the rejected material, the "efficiency figure" will be 100. Also if the percentage of "oversize" in the finished material is, for example, 12.50%, and the percentage of "undersize" in the rejected material is 87.50%, the two sizer products are alike by screen analysis and the "efficiency figure" is 0.

If for the moment we disregard the grinding problems found in closed circuits with sizing units, then the simplicity of the formula is justified. As proper sizing of the finished material controls the maximum grain sizes tolerated, the "fines" returned to the grinding unit will indicate what percentage circulating load is most desirable to procure a certain gradation of the grain sizes in the finished product. For ex-

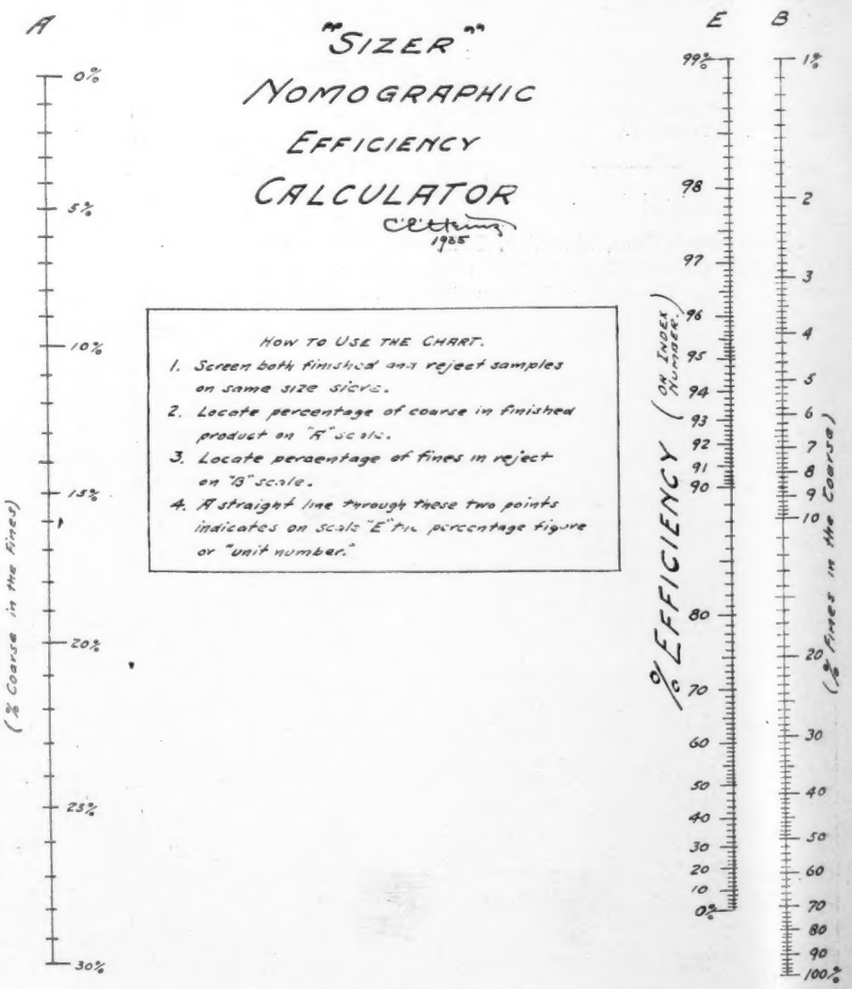


Chart for estimating efficiency of separating device

ample, if superfines are desired with a given maximum grain size, then the circulating load should be reduced, or should a minimum of superfines be desired, increase the circulating load. The percentage of "fines" in the returned product indicates that grinding condition desired. Of course the chart does not and cannot solve all grinding and sizing problems, but the data obtained from the use of the chart have been found of very practical value in sizing problems.

Sampling and Testing

Sampling the products of a sizing unit is most important because the data obtained from the chart can be no more accurate than the samples taken. Should a wet sizing unit be studied, the samples should be dried. A weighed portion of the dry sample should then be screened by "jigging" in water with some dispersing agent added, i. e., sodium silicate, to break down fines that tend to agglomerate. Both the finished product and rejected product must be screen tested in the same manner and on the same size testing sieve. The samples of a dry sizing unit should also be "jigged" in water when accurate sieve testing is desired. The material remaining on the testing sieves will dry rapidly because it is grainy and the loss in weight of the sample taken is called "fines."

The size of the testing sieve used in the test work must be the number of the "tolerated grain size." If 9% by weight of plus 1.50 mm. round hole punched plate is tolerated, then use a 1.50-mm. r.h.p.p. testing sieve. If not more than 10% by weight may remain on the No. 200 sieve, use the No. 200 sieve.

Chart Applications

Using the chart is very simple after the above data have been collected. The "A" scale is marked "per cent coarse in fines" and is the screen analysis of the finished material. The "B" scale is marked "per cent fines in the coarse" material, or the product leaving the sizer to return to the grinding unit, or discarded in differential open circuit grinding. A straight line from any point on "A" to any point on "B," from data obtained by the size tests, indicates on scale "E," the "efficiency" of the sizing unit under these conditions. This "efficiency number" could be called an index number, a base number or a "yardstick," but regardless of what we may call the number obtained by means of the chart, the fact remains that the results obtained in plant practice in improving sizing units and controlling grinding units, have been found most satisfactory.

With a series of tests made on a sizing unit when only one variable factor is being changed at one time, and the data obtained from the chart plotted, the graph indicates very clearly those factors most desirable to procure certain results.

The chart has been found useful in the office for recalculating testing data found in the literature when screen analyses only are given. This system and chart has also been found useful in making studies of grinding units.

Usually millmen demand simple sampling procedure, rapid testing and no complicated calculations. The nomograph will always be found very practical for plant problem calculations.

In plant control and unit study, it is obvious that data obtained from simple rapid tests taken at frequent intervals are far superior to more elaborate tests taken at less frequent times, because of the many variables always present in any processing plant.

Acknowledgment

The reproduction of the nomograph is by kind permission of the Independent Gravel Co., Joplin, Mo., and was a part of a report of a special study of the beneficiation of non-metallic minerals in its processing plants.

Lime Industry Shows Substantial Recovery in 1934

THE LIME sold by producers in the United States in 1934 amounted to 2,397,087 short tons valued at $17,164,024, according to figures compiled from reports made by lime manufacturers to the United States Bureau of Mines. This represents an increase of 6% in quantity and 20% in valued compared with 1933. Sales of hydrated lime, which are included in the above totals, amounted to 829,430 tons valued at $6,324,623, a decrease of 1% in quantity and an increase of 12.5% in value. The average unit value of all lime in 1934 was $7.16 a ton compared with $6.28 a ton in 1933 and 1932; hydrated lime showed an increase from $6.69 a ton in 1933 to $7.63 a ton in 1934.

Sales of lime used in the manufacture of chemicals—1,663,591 tons valued at $11,425,031—increased 12% in quantity and 25% in value; lime sold for construction—511,419 tons valued at $4,260,865—decreased 4% in quantity and increased 11% in value; and that sold for agricultural purposes—222,077 tons valued at $1,478,128—decreased 10% in quantity and increased 11% in value. The total number of plants that reported operations in 1934 was 324, 8 less than in 1933. Although lime manufacturing plants are distributed throughout the United States, there is much interstate shipment; and the volume of this traffic and the per capita consumption, by states, are shown in the accompanying table.

The great lead in per capita consumption by Nevada is evidently accounted for by a small population and a large metallurgical industry.

LIME SUPPLIES AVAILABLE FOR CONSUMPTION IN CONTINENTAL UNITED STATES IN 1934, BY STATES, IN SHORT TONS

State	Sales by producers	Shipments from state	Shipments into state	Supply: Hydrated	Supply: Quicklime	Supply: Total	Pounds per capita[1]
Alabama	123,881	37,433	9,355	10,152	85,651	95,803	71
Arizona	16,003	6,608	65	3,980	5,480	9,460	41
Arkansas	[2]	[2]	[2]	4,840	8,626	13,466	14
California	34,733	5,980	19,325	14,999	33,079	48,978	16
Colorado	3,712	.....	3,624	3,788	3,548	7,336	14
Connecticut	[2]	[2]	[2]	6,813	10,882	17,695	21
Delaware	.....	.....	17,723	8,223	9,500	17,723	146
District of Col.	.....	.....	9,875	8,729	1,146	9,875	40
Florida	14,207	75	14,746	15,651	13,227	28,878	37
Georgia	2,664	320	15,636	14,758	3,222	17,980	12
Idaho	[2]	[2]	[2]	635	1,142	1,777	8
Illinois	86,679	36,200	77,647	45,718	82,408	128,126	33
Indiana	72,606	45,327	52,837	32,440	47,676	80,116	48
Iowa	.....	.....	45,480	12,485	32,995	45,480	37
Kansas	.....	.....	21,224	10,557	10,667	21,224	22
Kentucky	[2]	.....	[2]	8,953	34,748	43,701	33
Louisiana	[2]	[2]	[2]	7,341	39,020	46,361	43
Maine	[2]	[2]	[2]	7,018	34,389	41,407	103
Maryland	28,167	9,509	32,705	27,236	24,127	51,363	61
Massachusetts	52,518	37,842	29,250	19,331	24,595	43,926	20
Michigan	32,844	19,736	100,739	33,654	80,193	113,847	45
Minnesota	[2]	[2]	[2]	8,465	11,960	20,425	16
Mississippi	.....	.....	9,867	3,381	6,486	9,867	10
Missouri	272,236	217,414	7,568	29,770	32,620	62,390	34
Montana	[2]	[2]	[2]	2,166	1,624	3,790	14
Nebraska	.....	.....	7,074	5,767	1,307	7,074	10
Nevada	[2]	[2]	[2]	10,661	1,288	11,949	254
New Hampshire	.....	.....	6,359	2,225	4,134	6,359	27
New Jersey	720	.....	84,906	53,141	32,485	85,626	40
New Mexico	[2]	[2]	[2]	724	3,961	4,685	21
New York	36,050	9,645	153,393	94,031	85,767	179,798	28
North Carolina	[2]	[2]	[2]	17,192	24,842	42,034	25
North Dakota	.....	.....	5,035	4,702	333	5,035	15
Ohio	562,041	362,779	97,141	68,607	227,796	296,403	87
Oklahoma	.....	.....	10,459	5,616	4,843	10,459	8
Oregon	[2]	[2]	[2]	913	7,202	8,115	16
Pennsylvania	434,519	185,292	126,569	109,210	266,586	375,796	76
Rhode Island	1,884	450	7,214	4,627	4,021	8,648	25
South Carolina	.....	.....	8,941	6,648	2,293	8,941	10
South Dakota	[2]	.....	[2]	2,305	2,195	4,500	13
Tennessee	122,818	100,960	8,766	12,402	18,222	30,624	23
Texas	36,620	3,190	1,987	20,778	14,639	35,417	12
Utah	9,611	290	44	2,890	6,475	9,365	36
Vermont	31,218	28,595	430	1,048	2,005	3,053	17
Virginia	94,041	65,907	42,052	25,231	44,955	70,186	57
Washington	22,764	7,076	1,309	2,812	14,185	16,997	21
West Virginia	143,071	109,827	82,293	10,916	104,621	115,537	129
Wisconsin	33,856	10,909	38,462	17,327	44,082	61,409	41
Wyoming	.....	.....	1,011	884	127	1,011	9
Undistributed	115,316	49,002	193,591	.....	.....	.....	....
	2,384,779	[3]1,350,366	1,344,702	821,740	1,557,375	2,379,115	38

[1]Based on Bureau of the Census preliminary statement. [2]Included under "Undistributed." [3]Includes 5,664 tons of lime exported or unspecified by producers as to destination.

Hints and Helps for Superintendents

Saves 75% Cost of Stacking Barrels

By C. C. Hassinger
Superintendent, E. J. Lavino & Co., Norristown, Penn.

I ENCLOSE some photographs showing a device developed by the writer for handling barrels of ground manganese ore weighing approximately 1000 lb. each.

No. 1 shows the device which can be attached to the platform of the high lift electric trucks.

No.'s 2 and 3 show the old method of transporting and stacking barrels two high. The old method was hazardous and required at least three men to stack the barrels two high.

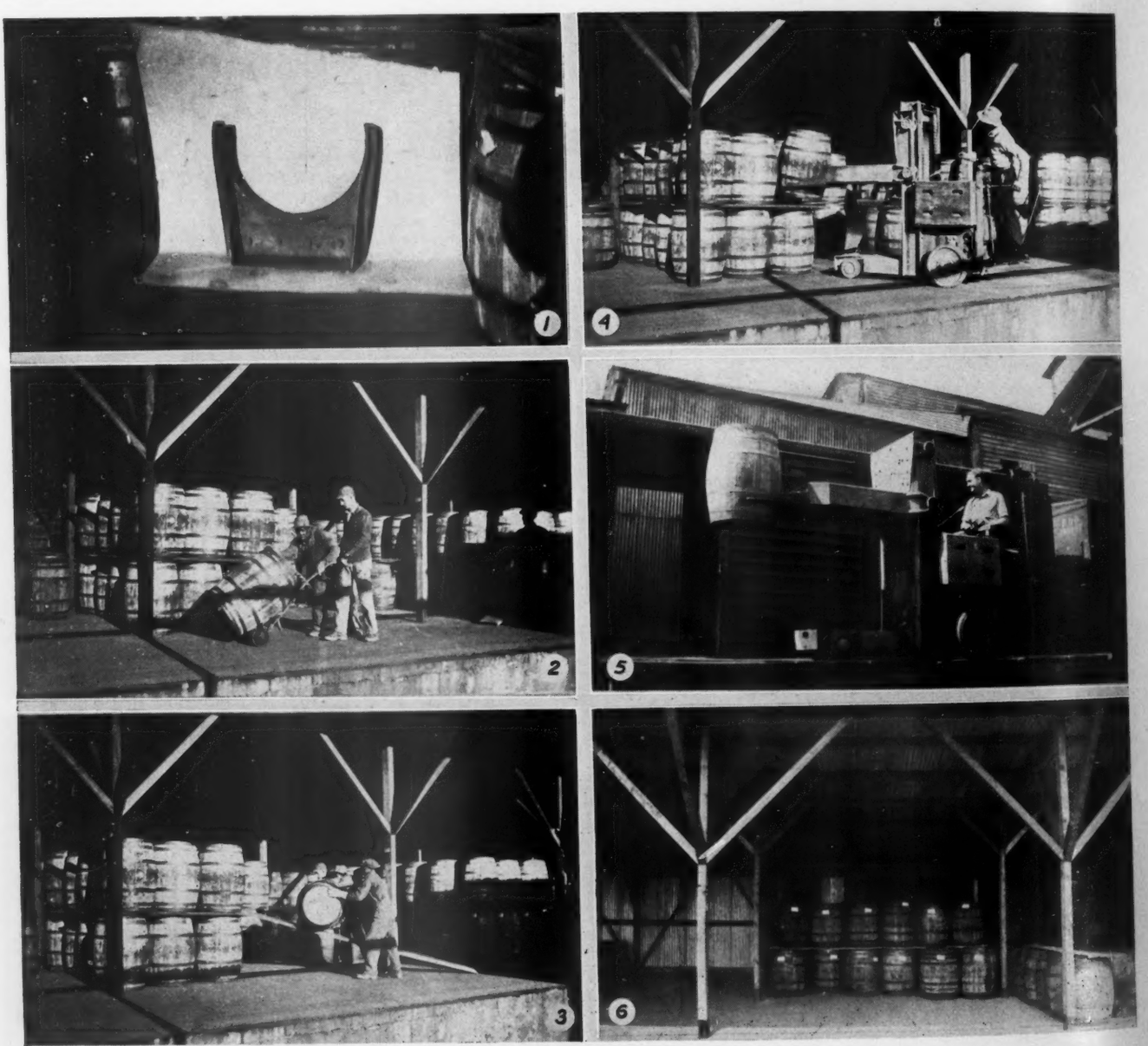
The new method as shown in No. 4 requires only one man and no more effort than the raising of the truck platform. In a trial to determine how fast a car could be loaded through the use of this device, one truck with one operator loaded 70 barrels in a car in as many minutes.

The barrels are filled at the mill, picked up by the trucks and placed on the scales where a standard weight is put in each barrel. From here they are taken to the packing room where the head is replaced.

The old method required replacing the head temporarily at the mill to transport it to the scales as it was transported in a tipped position.

No. 5 shows method of loading barrels in box car two high.

With the use of this device we are now handling barrels at approximately 25% of previous cost.



Development of an efficient barrel-handling device

Door for inspecting bucket elevator

Door for Inspection of a Bucket Elevator

SOMETIMES it is necessary to replace or adjust the buckets, or to inspect the head pulleys of an enclosed bucket elevator Such work can be done by removing one of the enclosing plates at the top of the elevator, but usually such a job takes considerable time. A much more convenient method is used at the gravel plant of the Consumers Co. at Afton, Wis. At this plant a square has been cut out of one of the upper plates, as shown in the photograph, and this square then hinged back in place with a piece of old belting, so that a convenient door is obtained. The hinge is fastened to the cut-out square, and to the plate itself by means of bolts. The square was cut out by the use of a welding outfit. Such a convenient door provides a means of rapid examination and easy repair for the bucket elevator. In later designs this has been taken care of by the manufacturer.

Use for an Old Shovel Boom

AT MANY quarries and sand pits there will be found old shovels, long out of use, from which parts have been taken to repair newer equipment. Frequently the booms of these shovels have not been taken away and the booms can be easily made into satisfactory chutes for stone, sand or coal. The illustration shows the use of one at a crushed stone operation for delivering coal to cars in the quarry.

Chute made from old shovel boom

Home-made derail switch

Movable Aligning Idler for Belts

AT GRAVEL OPERATIONS where long field belts are used in the pit to bring the material to the washing plant, the belts are apt to ride to one side or the other on the idlers unless held in place by vertical bars or side idlers. Bars are inexpensive, but will wear the sides of the belt, so a better method is to use a movable aligning idler which can be taken from place to place along the structure, to be used at the point where the belt is most likely to ride to one side. This movable feature permits changing the location of the idler as the belt is lengthened in the pit, so it will always be about half way between the head and tail pulleys.

Such an idler can be readily built on a plank slightly longer than the conveyor frame is wide. Half an old idler is set up at each end of the plank, as shown in the photograph, with the shafts in vertical positions. The upper ends of the shafts are held rigid by tripods of strap iron, as shown. This idler can be slipped under the belt at any required point, and temporarily spiked down to the conveyor frame. The idler shown is in use in the pit at the Janesville Sand and Gravel Co., Janesville, Wis.

A movable aligning idler

Automatic Derail Switch

By V. W. Phillips,
Bangor, Penn.

HERE, in the accompanying illustration, is a simple, home-made derail switch which automatically stays open, but is easily closed from a distant point. An automobile spring leaf and a wire cable and pulleys are the only essentials. The switch is closed by pulling wire cable which is attached to the movable rail.

Protection for Take-Up Pulley

THE TAKE-UP PULLEY of a belt conveyor is a source of wear to the belt passing over it. Most of the wear is unnecessary as it is caused by particles of crushed rock (or gravel) falling between the belt and the face of the pulley. By protecting the pulley from this falling material most of the wear can be eliminated.

At the quarry operated by Graham Bros., Inc., on Catalina Island, the take-up pulley is protected by a novel use of old discarded perforated screen. The sides of the pulley are enclosed in sheets of perforated plate as shown in the illustration. This method protects the pulley and has the added advantages of adding weight to the take-up pulley and at the same time leaving the entire assembly open to inspection.

Discarded screen protects pulley

RECENT QUOTATIONS ON ROCK PRODUCTS SECURITIES

Stock	Date	Bid	Asked	Dividend
Allentown P. C., com.[47]	9-18-35	4	6	
Allentown P. C., pfd.[47]	9-18-35	5½	7	
Alpha P. C., com.	9-17-35	16½	actual sale	.25(qu.) Oct. 25
Amalgamated Phos. 6's, 1936[47]	9-18-35	102½	103½	
American Aggregates, com.[48]	9-11-35	1	2	
American Aggregates, pfd.[48]	9-11-35	2	5	
American Aggregates, 6's 1st mtg. 3/6's, 1943, new bonds[48]	9-11-35	40	....	
American Aggregates, 6's, 1943, old bonds[48]	9-11-35	40	....	
American L. and S., 1st 7's[48]	9-11-35	102	....	
Arundel Corp., com.[48]	9-11-35	20	21½	.25 (qu.) Oct. 1
Ashgrove L. & P. C., com.[49]	9-13-35	12	....	
Ashgrove L. & P. C., pfd.[49]	9-13-35	95¾	....	
Bessemer L. and C., Class A[47]	9-18-35	7	8	
Bessemer L. and C., 1st 6½'s, 1947[46]	9-11-35	40	....	
Bessemer L. and C., cert. of dep., 1947[46]	9-10-35	44	45	
Bloomington Limestone, 6's[47]	9-18-35	7	9	
Boston S. and G., new, com.[37]	9-11-35	1	3	
Boston S. and G., new 7%, pfd.	9-18-35	6	actual sale*	
Boston S. and G., 7's, 1930[37]	9-11-35	70	....	
Calaveras Cement, com.[40]	9-10-35	4	4½	
Calaveras Cement, 7% pfd.[40]	9-10-35	60	63	
California Art Tile, A[9]	9-11-35	7	9	
California Art Tile, B[9]	9-11-35	½	1	
Canada Cement, com.[42]	9-11-35	6⅛	6⅜	
Canada Cement, pfd.[42]	9-11-35	53½	55	
Canada Cement, 5½'s, 1947[42]	9-11-35	102½	103½	
Canada Crushed Stone, bonds[42]	9-11-35	95	....	
Canada Crushed Stone, com.[42]	9-11-35	5 nominal		
Certainteed Products, com.	9-17-35	6¼	6¾	
Certainteed Products, pfd.	9-17-35	62¾	63½	
Certainteed Products, 5½'s, 1948	9-17-35	87⅞	actual sale	
Consol. Cement, 1st 6½'s 1941[47]	9-18-35	35	37	
Consol. Cement, pfd.[47]	9-18-35	3	4	
Consol. Okla. S. and G. (Can.) 6½'s[42]	9-11-35	20½	25½	
Consol. S. and G., pfd.[42]	9-11-35	25	....	
Consol. Rock Products, com.[47]	9-18-35	½	1	
Consol. Rock Products, pfd.[47]	9-18-35	1	2	
Consol. Rock Products, units	9-18-35	2	3	
Construction Mat., com.	6-12-35	6c	actual sale†	
Construction Mat., pfd.	6-12-35	12c	actual sale‡	
Consumers Rock & Gravel, 1st mtg. 6½'s, 1948[47]	9-18-35	20	25	
Coosa P. C., 1st 6's[47]	9-18-35	20	25	
Coplay Cement Mfg., pfd.[47]	9-18-35	12	15	
Coplay Cement Mfg., 6's, 1941[47]	9-18-35	73	76	
Cumberland P. C., 7's, 1937[47]	9-18-35	75	80	
Dewey P. C., com.[47]	9-18-35	35	40	
Dolese and Shepard	9-17-35	20	22	
Dufferin Pav. and Cr. Stone, com.[42]	9-11-35	2	....	
Dufferin Pav. and Cr. Stone, pfd.[42]	9-11-35	27	30	
Federal P. C., 6½'s, 1941[47]	9-18-35	15	20	
Fla. Port. Cement, 6½'s, 1937[46]	9-10-35	99	100	
Fla. Port. Cement, units[47]	9-18-35	21	23	
Giant P. C., com.[47]	9-18-35	3	5	
Giant P. C., pfd.[47]	9-18-35	11	13	
Gyp. Lime & Alabastine, Ltd.	9-13-35	5½	actual sale	
Gyp. Lime & Alabastine, 5½'s, 1948[47]	9-18-35	92	95	
Hawkeye P. C., cap.[49]	9-13-35	29	....	
Hercules Cement, com.[49]	9-13-35	16	....	
Hercules Cement, 7% pfd.[49]	9-13-35	80	....	
Hermitage Cement, com.[47]	9-18-35	12	15	
Hermitage Cement, pfd.[47]	9-18-35	80	85	
Ideal Cement, 5's, 1943[47]	9-18-35	102	103	
Ideal Cement, com.[47]	9-18-35	40	41	.50 (qu. and ex.)Oct. 1
Indiana Limestone 6's[47]	9-18-35	10	12	
International Cement bonds, 5's, 1948	9-17-35	103¾	actual sale	
International Cement, com.	9-17-35	28¼	29½	25 (quar.) Sept. 30
Kelley Island L. and T.	9-17-35	16	17	.20 (qu.) Oct. 1
Ky. Cons. Stone, 6½'s, 1938[47]	9-18-35	20	22	
Ky. Cons. Stone, com.[47]	9-18-35	1	2	
Ky. Cons. Stone, pfd.[47]	9-18-35	2	3	
Ky. Cons. Stone, 1st mtg. 6½'s[46]	9-10-35	15	17	
Ky. Rock Asphalt, com.[46]	9-10-35	½	¾	
Ky. Rock Asphalt, pfd.[46]	9-10-35	1½	2½	
Ky. Rock Asphalt, 6½'s, 1935[47]	9-18-35	30	35	
Lawrence P. C.[49]	9-12-35	15⅞	18	
Lawrence P. C., 5½'s, 1942[47]	9-18-35	100	101	
Lehigh P. C., com.	9-17-35	12¼	13	
Lehigh P. C., 7% pfd.	9-13-35	99	102	
Louisville Cement	9-17-35	80	....	
Lyman-Richey 1st 6's, 1935[47]	9-18-35	15	20	
Marbelite Corp., com. (cement pts.)[49]	9-10-35	¼	¾	
Marbelite Corp., pfd.[40]	9-10-35	4	....	
Marblehead Lime, 7's, 1944[14]	9-10-35	65	70	
Marquette Cement, com.[47]	9-18-35	24	26	
Marquette Cement, pfd.[47]	9-18-35	95	100	
Marquette Cement Mfg. 1st 5's, 1936[47]	9-18-35	101	102	
Marquette Cement Mfg. 1st 6's, 1935[46]	9-18-35	100½	102	
Material Service Corp.[47]	9-18-35	4	6	
McCrady-Rodgers, com.[47]	9-18-35	6	8	
McCrady-Rodgers, 7% pfd.[47]	9-18-35	35	40	

RECENT QUOTATIONS ON ROCK PRODUCTS SECURITIES

Stock	Date	Bid	Asked	Dividend
Medusa P. C., com.[47]	9-18-35	17	18	
Medusa P. C., pfd.[47]	9-18-35	45	50	
Michigan L. and C., com.[47]	9-18-35	50	55	
Missouri P. C.	9-17-35	8½	9	
Monarch Cement, com.[47]	9-18-35	75	85	
Monolith P. C., com.[9]	9-11-35	2	3	
Monolith P. C., 8% pfd.[9]	9-11-35	3½	4	
Monolith P. C., units[9]	9-11-35	9	11	
Monolith P. C., 1st mtg. 6's[9]	9-11-35	100	101	
Monolith Portland, Midwest, pfd.[9]	9-11-35	1¼	1½	
National Cement (Can.) 1st 7's[42]	9-11-35	102¼	....	
National Gypsum A., com.	9-24-35	26¾	actual sale	
National Gypsum, pfd.[47]	9-18-35	92	95	
National Gypsum, 6's[47]	9-18-35	105	107	
National L. and S., 6½'s, 1941[47]	9-18-35	98	100	
Nazareth Cement, com.[47]	9-18-35	5	7	
Nazareth Cement, pfd.[47]	9-18-35	45	48	
Newaygo P. C., 7% cum. pfd.[49]	9-13-35	29	....	
Newaygo P. C., 1st 6½'s, 1938[46]	9-10-35	95	97	
New England Lime, units[14]	9-10-35	7	10	
N. Y. Trap Rock, 1st 6's, 1946.	9-13-35	80	80⅛	
N. Y. Trap Rock, 6's, stamped, 1946	9-13-35	78¾	80	
N. Y. Trap Rock, 7% pfd.[46]	9-10-35	40	45	
North Amer. Cement, 1st 6½'s, 1953[47]	9-18-35	25	26	
North Amer. Cement, 6½'s, 1943[47]	9-18-35	88	90	
North Amer. Cement, 6½'s, 1940[47]	9-18-35	60	63	
North Amer. Cement, com.[47]	9-18-35	1	2	
North Amer. Cement, 7% pfd.[47]	9-18-35	2	3	
North Shore Mat. 1st 6's[47]	9-18-35	45	48	
Northwestern Port. Cem. units[49]	9- 2-35	40	43	
Northwestern States P. C.[47]	9-18-35	17	20	
Ohio River S. and G., com.	9-17-35	....	2	
Ohio River S. and G., 1st pfd.	9-17-35	56	....	
Ohio River S. and G., 2nd pfd.	9-17-35	....	7	
Ohio River S. and G., 6's[46]	9-10-35	10	12	
Oregon P. C., com.[47]	9-18-35	3	5	
Oregon P. C., pfd.[47]	9-18-35	65	70	
Pacific Coast Agg., new com.[40]	9-10-35	1⅝	1¾	
Pacific P. C., com.[40]	9-10-35	2¾	3¼	
Pacific P. C., pfd.[40]	9-10-35	39	41	
Peerless Cement, com.[47]	9-18-35	½	1	
Peerless Cement, pfd.[47]	9-18-35	3	4	
Penn.-Dixie Cement, com.	9-13-35	3⅝	3⅞	
Penn.-Dixie Cement, pfd.	9-13-35	22	25	
Penn.-Dixie Cement, 6's A, 1941	9-17-35	90	actual sale	
Penn Glass Sand Corp., 6's[47]	9-18-35	106	107	
Penn. Glass Sand Corp., pfd.[47]	9-18-35	104	107	3.50 (qu. & ac.) Oct. 1
Petoskey P. C., 6's, 1941[48]	9-11-35	90	....	
Petoskey P. C., 6's, 1935-38[48]	9-11-35	90	....	
Petoskey P. C., com.[48]	9-11-35	3½	....	
Republic P. C., 6's, 1943[47]	9-18-35	95	97	
Riverside Portland Cement, A[9]	9-11-35	5½	7	
Riverside Portland Cement, B[9]	9-11-35	¾	1	
Riverside Portland Cem., pfd.[9]	9-11-35	92	95	
Rockland and Rockport Lime, 1st pfd.[47]	9-18-35	2	3	
Santa Cruz P. C., com.[9]	9-11-35	30	35	
Schumacher Wallboard, com.[9]	9-11-35	1½	2¼	
Schumacher Wallboard, pfd.[9]	9-11-35	8	12	
Signal Mt. P. C., units[47]	9-18-35	36	38	
Signal Mt. P. C. 6's, 1936[46]	9-10-35	100	102	
Southwestern P. C., units[40]	9-10-35	190	....	
Spokane P. C., units[49]	9-13-35	7¼	....	
Standard Paving & Mat. (Can.), com.[42]	9-11-35	80c	1¼	
Standard Pav. & Mat., pfd.[42]	9-11-35	10	15	
Superior P. C., A[40]	9-10-35	34	36	.27½ (ac.) Sept. 3
Superior P. C., B[40]	9-10-35	11½	14½	
Trinity P. C., units[47]	9-18-35	17	20	
U. S. Gypsum, com.	9-18-35	70½	71	
U. S. Gypsum, pfd.	9-18-35	155	159	
Volunteer P. C., pfd.[49]	9-13-35	50	....	
Volunteer P. C., com.[49]	9-13-35	2	....	
Vulcanite P. C., com.[49]	9-13-35	3	6	
Vulcanite 7½'s, 1943[49]	9-13-35	55	....	
Wabash P. C.[47]	9-18-35	8	10	
Warner Co., ww. 1st 6's[47]	9-18-35	38	40	
Warner Co., com.[47]	9-18-35	1	2	
Warner Co., pfd.[47]	9-18-35	3	5	
Whitehall Cement Mfg., com.[47]	9-18-35	35	40	
Whitehall Cement Mfg., pfd.[47]	9-18-35	60	70	
Wisconsin L. & C., 1st 6's, 1940[47]	9-18-35	50	55	
Wolverine P. C., com.[47]	9-18-35	3	4	
Yosemite P. C., A. com.[40]	9-10-35	2	2½	

Quotations by: [9]A. E. White Co., San Francisco, Calif. [14] The Securities Co. of Milwaukee, Inc., Milwaukee, Wis. [37]Wise, Hobbs & Seaver, Inc., Boston. [40]Martin Judge, Jr., and Co., San Francisco, Calif. [42]Nesbitt, Thomson & Co., Toronto. [46]First National Bank of Chicago, Chicago, Ill. [47]Anderson Plotz and Co., Chicago, Ill. [48]Hewitt, Ladin & Co., New York, N. Y. [49]Feldman & Co., Inc., Boston, Mass.

† 60 shares sold at auction, at New York, N. Y.
‡100 shares sold at auction, at New York, N. Y.
*10 shares sold at auction at Boston, Mass.

Recent Dividends Announced

Alpha Portland Cement Co., com. (quarterly)	$ .25	October 25, 1935
Arundel Corporation (quarterly)	.25	October 1, 1935
Ideal Cement, cap. (quarterly & extra)	.50	October 1, 1935
Kelley Island Lime & Transport Co. (quarterly)	.20	October 1, 1935
Minnesota Mining & Manufacturing Co. (quarterly)	.15	October 1. 1935
(extra)	.02½	October 1, 1935
National Gypsum Co., 2nd pfd. (initial) (quarterly).	.25	October 1, 1935
Pennsylvania Glass Sand Corp., cum. pfd. (quarterly & accum.)	3.50	October 1, 1935
Southwestern Portland Cement, com. (quarterly)	1.00	October 1, 1935
pfd. (quarterly)	2.00	October 1, 1935

◆ ◆ ◆

Arundel Corp., Baltimore, Md., reports net profit after depreciation, federal taxes, etc.:

	1935	1934
3 months to June 30	201,163	163,272
6 months to June 30	379,821	311,632

Quarterly Earnings, per share (in dollars):

	1935	1934
1st quarter	0.36	0.30
2nd quarter	0.41	0.33
6 months	0.77	0.63
3rd quarter	...	0.53
9 months	...	1.16
4th quarter	...	0.32
12 months	...	1.48

◆ ◆ ◆

Consolidated Cement Corp., Chicago, Ill., reports interest of 3% was paid August 1 on 15-year first mortgage 6% cumulative income bonds dated February 1, 1935, and 3% on the 6% cumulative income notes. From May 1, 1935, to July 31, 1935, the period since the financial reorganization of the company was approved, earnings were as follows:

Profit	$113,021
Bond and note interest, and expense	32,648
Depreciation and depletion	38,838
Net profit	$ 41,536

The balance sheet as of July 31 showed total assets of $5,954,597, with $281,272 in cash. Total current assets were $763,997 and current liabilities $101,593.

◆ ◆ ◆

Bessemer Limestone and Cement Co., Youngstown, Ohio, reports for the six months ended June 30, 1935, giving effect to capital charges of the new corporation:

Net sales	$352,456.94
Deduct cost of sales, manufacturing expenses, sales and administration expenses (excluding depreciation and bond-note interest)	261,528.33
Profit before depreciation and interest	$ 90,928.61
Deduct interest charges	38,685.00
Profit before depreciation	$ 52,243.61
Deduct depreciation	76,800.00*
Loss before other revenues	$ 24,556.39
Other revenues	16,968.60
Loss for period	$ 7,587.79

*Estimated.

Schumacher Wall Board Corp., San Francisco, Calif. (gypsum products), reports for the year ended April 30, 1935, a net profit of $953 after all charges, including taxes, depreciation, and $1140, representing the company's portion of the loss sustained by its subsidiary, Gypsum Products Corp. This compares with a net loss of $45,051 in the preceding fiscal year, which included $10,908 as the company's share of its subsidiary's loss. As of April 30, 1935, current assets totaled $116,000 and current liabilities amounted to $69 000. A year previous, current assets totaled $98,386 and current liabilities totaled $62,167.

◆ ◆ ◆

Aberene Stone Corp. of Virginia, New York City (soapstone), reports sales and earnings for the five months to May 31, 1935:

Net sales	$38,408
*Net income	9,708
Earned per share	$0.14

*After taxes, depreciation, interest, etc.

◆ ◆ ◆

Trinity Portland Cement Co., Dallas, Tex., reports sales and earnings for the year ended December 31, 1934:

Net sales	$1,006,629
*Net loss	62,939
†Earned per share, common	(d)$10.60

No. of common shares, 17,500.
*After depreciation, depletion, etc.
†Disregarding preferred dividend arrears.

Current assets and liabilities as of December 31, 1934, and December 31, 1933, compare as follows:

	1934	1933
*Current assets	$865,637	$816,700
Current liabilities	326,908	459,589
Working capital	538,729	357,111

*Includes cash: 1934, $192,627; 1933, $87,141.

◆ ◆ ◆

Gypsum, Lime and Alabastine, Canada, Ltd., Montreal, Que.: Shareholders have approved a by-law to write down goodwill and other items to present-day values and to write off bond discount and cumulative deficit, the effect of which reduces the book value of the outstanding no par value shares to $5 a share.

In asking the shareholders to approve the by-law, George A. Dobbie, vice-president of the company, emphasized the fact that there would be no reduction in the number of shares outstanding or their actual value, neither are any of the assets being disposed of. Goodwill and patents owned by the company, while being written down to a normal amount, are still regarded as of intrinsic value.

The items affected by the by-law are as follows, the figures shown being the amount written off:

Patents	$ 61,278
Bond discount	200,818
Goodwill	725,942
Trustee stock	227,162
Deficit	504,887
Advances and invest. in subsids.	167,035
Sundry assets	34,082
Plants and properties	848,573
Mines, mine devel., quarries, etc.	1,213,400
Total	$3,983,177

In regard to operations, F. Andrews, general manager, told the shareholders that from an operating standpoint there would be a decrease in charges resulting from the revaluation of assets, and particularly those required for taxes, insurance and provision for depreciation and depletion. It was also stated that the sales volume showed a slight increase over last year to date, and that prospects for the balance of the year would indicate a more profitable year than 1934. The English plant, he said, is operating at capacity and is showing a substantial net monthly profit.

◆ ◆ ◆

North American Cement Corp., New York City, reports for the 12 months ended June 30, 1935, a net loss of $292,225 after taxes, depreciation, depletion, interest and amortization, against net loss of $463,632 for the 12 months ended June 30, 1934.

◆ ◆ ◆

Marquette Cement Manufacturing Co., Chicago, Ill., announced August 27 a call for redemption on October 1, 1935, of all its outstanding first mortgage serial bonds. Two series of bonds are outstanding, one carrying a 6% interest coupon and the other a 5% coupon. The maturities of the called bonds run serially to October 1, 1945, from October 1, 1936, the aggregate principal amount being $2,675,000. It was stated at the offices of the company that no public offering of new securities would be made, and while no definite statement was forthcoming on the details of any refinancing operation, it is generally understood that arrangements were made with a large Chicago banking institution for assistance in financing the call of the outstanding bonds.

◆ ◆ ◆

Kentucky Stone Co., Louisville, Ky., has been incorporated with a capital of $7750 by Thomas B. Bullitt, Wiley B. Bryan and John N. Mackall, to take over from the receiver of the bankrupt Kentucky Consolidated Stone Co. the assets and operation of the latter company. These men have been named by Federal Judge Dawson as trustees for the bondholders of the defunct company, and have agreed to operate the new company for a period of five years for the protection of the bondholders, at the expiration of which time the court will decide on the distribution of the common stock represented to the bondholders. The company controls approximately 15 well-located quarries over the state, which produce and supply much stone to highway construction, building, railroad ballast, and general construction. The original merger of the various companies into the one unit, a promotion that might have worked out except for the depression, was top-heavy. Sam Burnam and the late Ben S. Washer were named receivers nearly three years ago. After the death early this year of Mr. Washer, Mr. Burnam carried on. Mr. Burnam, a company man, goes with the new company. Mr. Mackall has been with the company for years.

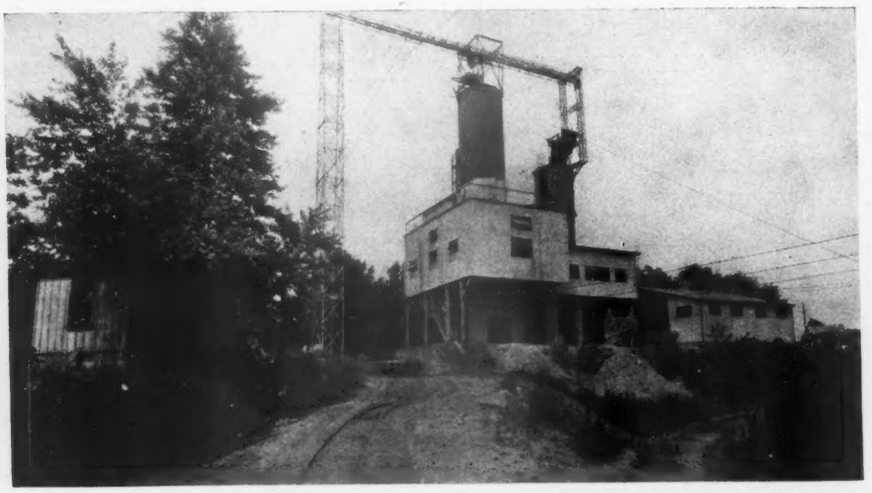
Lime Producers' Forum

Conducted by Victor J. Azbe,
Consulting Engineer, St. Louis, Mo.

The Ultra New in Natural Gas-Fired Kilns

COMPLETION and placing in operation of a new lime plant is an event. This is particularly so in the case of Glencoe Lime and Cement Co.'s Glen Park, Mo., plant, as here the plant layout and kiln design are of the very latest type, incorporating features never before used in the lime industry.

The Glencoe company has other plants, but its president, Gus. H. F. Johannes, was not satisfied with somewhat obsolete equipment. His craving was for something of an advanced type. The original Glen Park plant, although old, could hardly be called obsolete as lime plants go, but a fire did considerable damage to it; and as at that time opportunity offered to obtain natural gas, it was decided to reconstruct only one of the old kilns (to be used temporarily) and to build a large new unit in such a way that later other similar units could be added.



First unit of the new plant (with the rebuilt old kiln) of the Glencoe Lime and Cement Co.

Built to Utilize Advantages of Natural Gas

The advantages inherent in the use of natural gas were realized from the beginning, and the plant was built with the prime purpose to realize them to the full extent. The result is a plant of fairly small kilns of very high capacity, conveniently operated at low unit labor cost, using costly fuel at low cost per ton of lime. There is also great flexibility, and at a moment's notice kiln capacity can be raised from 25 tons to 50 and even 60. There is full control for everything and, like any modern machine, it can be accelerated or slowed down to nothing by no more than a few turns of the wrist and taking of a few steps. And this was obtained at a cost that per ton of capacity is lower than that of any other lime plant built in this country; all because the inherent advantages in the use of natural gas were realized and capitalized.

The main advantage is simplicity of plant, for gas can be brought to the kilns as simply as water to a house. The experience with this plant leads to the belief that when natural gas is available at a reasonable figure, old obsolete lime kilns may be scrapped and their investment forgotten. This has not been the case, heretofore, and what held back the technical advance of the lime industry was that the cost of modernization ordinarily exceeded the gains resulting therefrom. In view of this, the Glen Park plant could well be called "the pilot natural gas lime plant of the lime industry." While other natural gas lime plants have been built, in none of them have possibilities been so fully correlated as in this plant.

The original Glen Park, Mo., plant of the Glencoe Lime and Cement Co.

Loading the Kilns

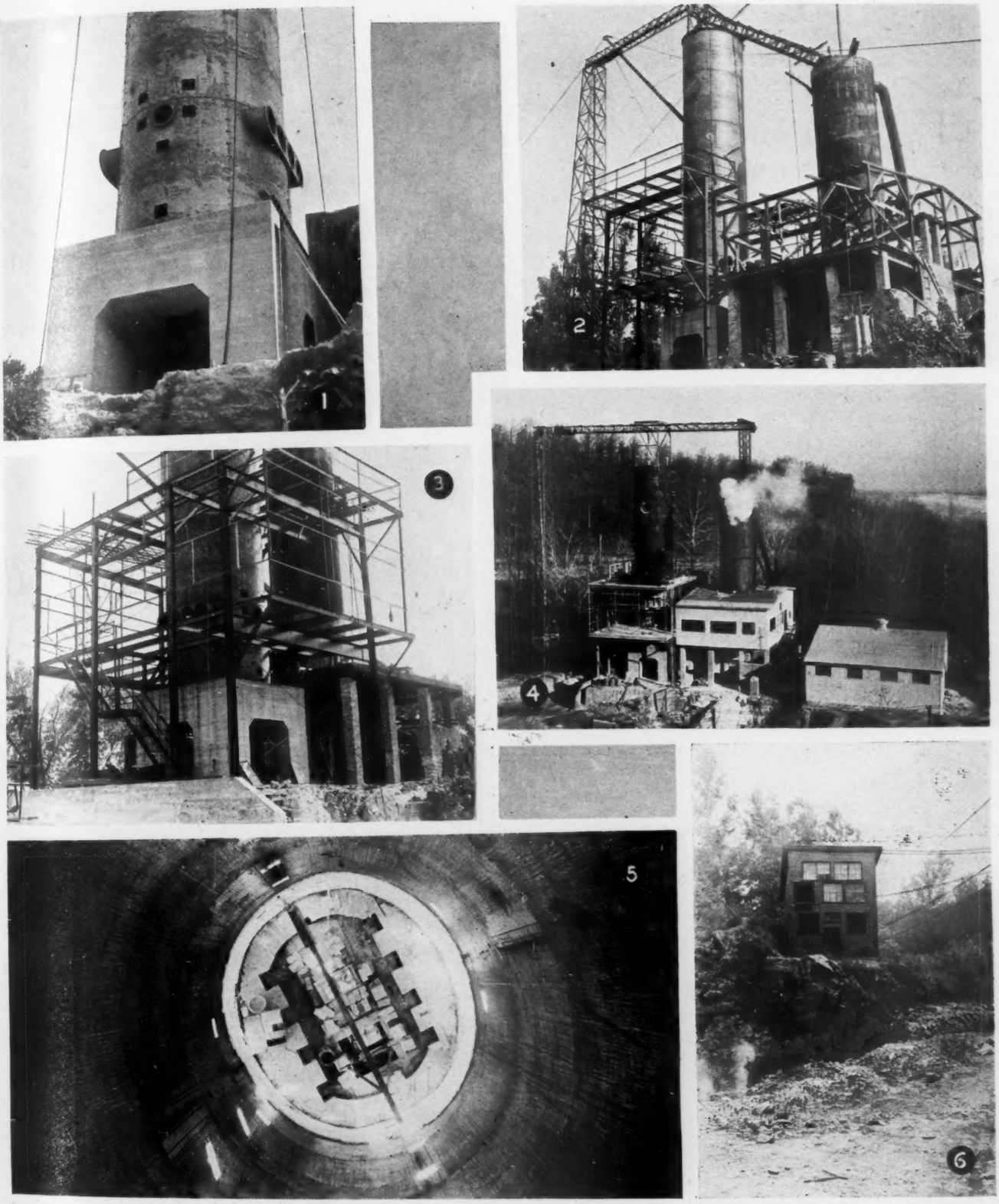
The hoisting of stone to the kilns due to the nature of the surrounding ground was somewhat difficult of solution. An incline could not be used; skips and elevators were too costly and clumsy. Finally, a somewhat unusual method was adopted, far cheaper than the others, and it is proving quite satisfactory. The boxes loaded with stone at the quarry are lifted from the trucks, hoisted and dumped into the kiln. As the kiln top is tightly closed, the box in being lowered first comes against a lever and the box's weight opens the charging door against the resistance of counterweights, which close the door after the box has been emptied. This method requires no man on the kiln top and is suitable for any number of kilns in a line.

As the old, reconstructed kiln is off this straight line and its top much lower than the new kiln, a queer looking chute had to be built, but this kiln will later be torn down and replaced, and eventually there will be a line of four kilns similar to the first, having a total maximum capacity of 240 tons. The rock-handling system consists of structural steel, but the main item is wire rope (Broderick & Bascom).

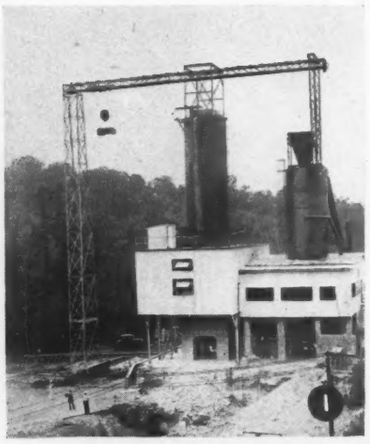
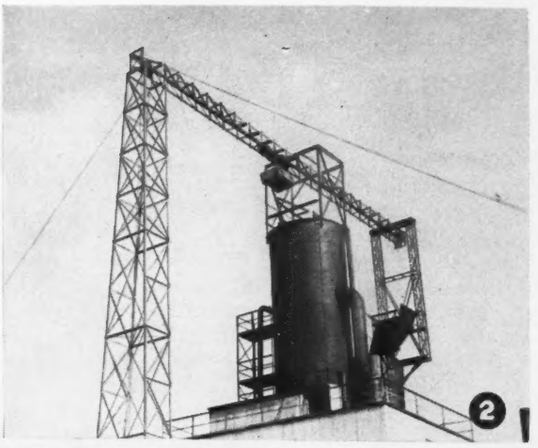
Kiln Details

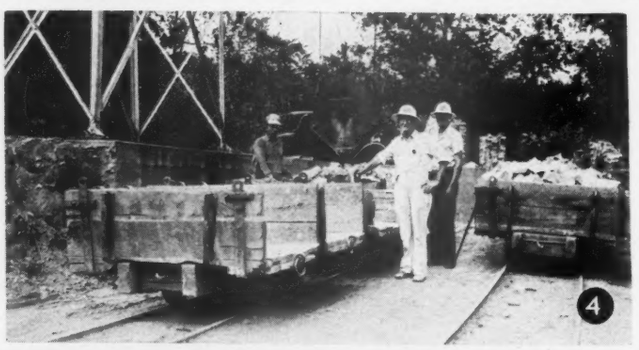
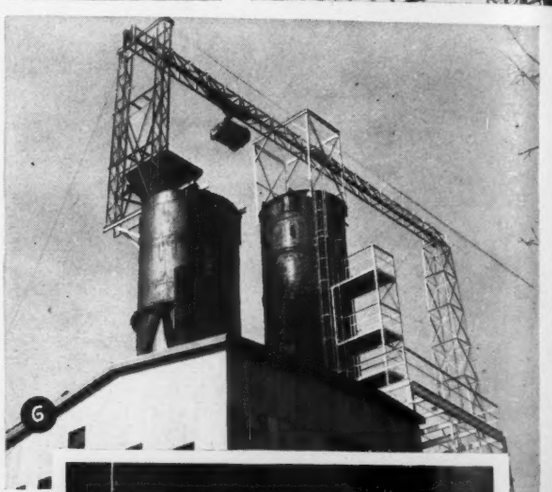
The uppermost part of the kiln is comparatively inactive; while a small portion of the gaseous products of combustion comes up through, the greater portion of them is drawn off below, thus making the upper part of the kiln a true storage zone. This has considerable advantage. Operation is more uniform, for stone is always waiting to refill the active part of the kiln whenever lime is drawn, day or night.

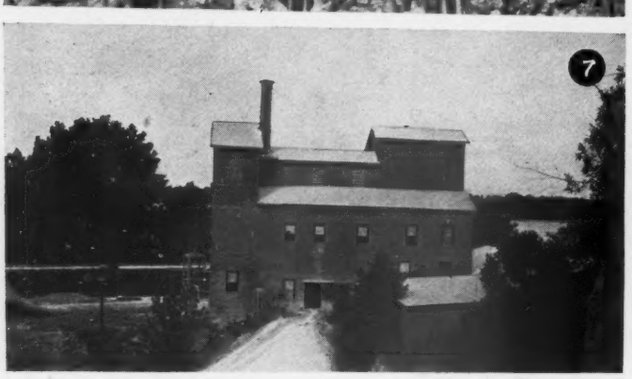
The kiln gas off-take is a heavy slated



(1) New kiln foundation and shell—concrete foundation especially designed to prevent cracks from heat expansion; (2) New kiln and the old one; (3) Housing—simplest construction consistent with strength, roominess and protection; (4) Old kiln in operation, the large new one still under construction; (5) Cross-section of new kiln showing construction details and lining; (6) Hoist house




(1) General view of the rock-handling system developed for this plant; (2) Another view of the structural steel work on rock-handling system; (3) Car body or box being hoisted; (4) Quarry boxes on car trucks—in foreground is "Pat" Lynch, superintendent; (5) Row of boxes waiting to be hoisted; (6) Another view, showing box about to be lowered; note safety ladder and platform to reach the poke holes; (7) Crushing, hydrating and screening plant; (8) Draw cart under kiln; note air ducts for admission of air to cooler

pipe cast from Fulton Iron Works "Fultaloy metal," which has the property of retaining great strength even at red heat. However, by this is not meant that the kiln is operated with any such high waste-gas temperatures. In fact, temperatures fluctuate between only 300 deg. and 600 deg. F.; but if the kiln should be slow fired for any reason, off-take temperatures could readily become very high, and it is best to be safe.

The active part of the kiln is a shaft of 6 ft. x 10½ ft. x 37 ft. high, somewhat oval in cross section with a shaft area of 60 sq. ft. The lining is of Harbison-Walker 13½x3x6-in. brick. In the hottest zone is the highest grade product "Coralite"—80% alumina brick; further up the kiln where temperatures are milder, lower grades of brick are used, thus making the refractory lining fit the conditions. The kiln will readily make 1700 lb. of lime a day per square foot of shaft area, and indications are that this figure could be brought up to an even ton, but that has not as yet been tried.

Gas Burners

Gas is admitted on one level only, but at very numerous points; not only are there four burners on each side, but also a burner on each end, and gas is admitted by a special system even right into the middle of the shaft. In all there are 14 points for gas admission; and in this case the fireman never complains that his "middle" is cold and rocky, because gas can be admitted direct to it.

The burners are not burners in a true sense, for the intention is not to burn any gas in them. All the burning must take place within the kiln. They are nothing but delivery channels and mixing chambers for some air and CO_2 gas, the latter for the tempering of the flame. The eyes are small and so arranged that one seldom needs to be cleaned; and as to the center burners, which one would think would always give trouble from clogging up, actually they never clog.

The gas to each burner is gauged by a small gauge connected across an orifice, and so the fireman at all times is certain of his gas distribution. The main stream, on the other hand, is metered by a Foxboro recorder, and the amount of gas used at any time of the night can be read from the chart by the superintendent, Pat Lynch, in the morning.

Lime Drawing

From the hot zone the lime sinks into the cooler, which is a cooler in fact, for when lime is drawn it is cold enough to be loaded into the railroad cars direct. While some small amount of air enters the kiln with the natural gas, most of it passes up through the cooler, thus cooling the lime and saving the heat. At low capacities the cooler operates under natural draft, but when the kiln is stepped up air is forced into the cooler, which is of decided advantage. To be able to do this the draw gates had to be of special design and rather tight fitting.

Lime is now drawn into a large cart, but the space under the cooler is so large that a motor truck could be used, or any other method. All lime drawn passes first over a platform scale, so there is no question as to amount of lime obtained, not only during a day but from each draw as well.

The kiln shell is oval in cross-section, 12 ft. 8 in. x 14 ft. 2 in. The reason for making it so was economy of materials. Ordinarily kiln shells are of circular cross-section. This means more steel, more brick, more weight, and so a larger foundation. In this case the idea was kept in mind that the kiln was the hole in the middle, and there was to be no extraneous part. All was either to make lime or to serve some other definite purpose as protection or strength of support.

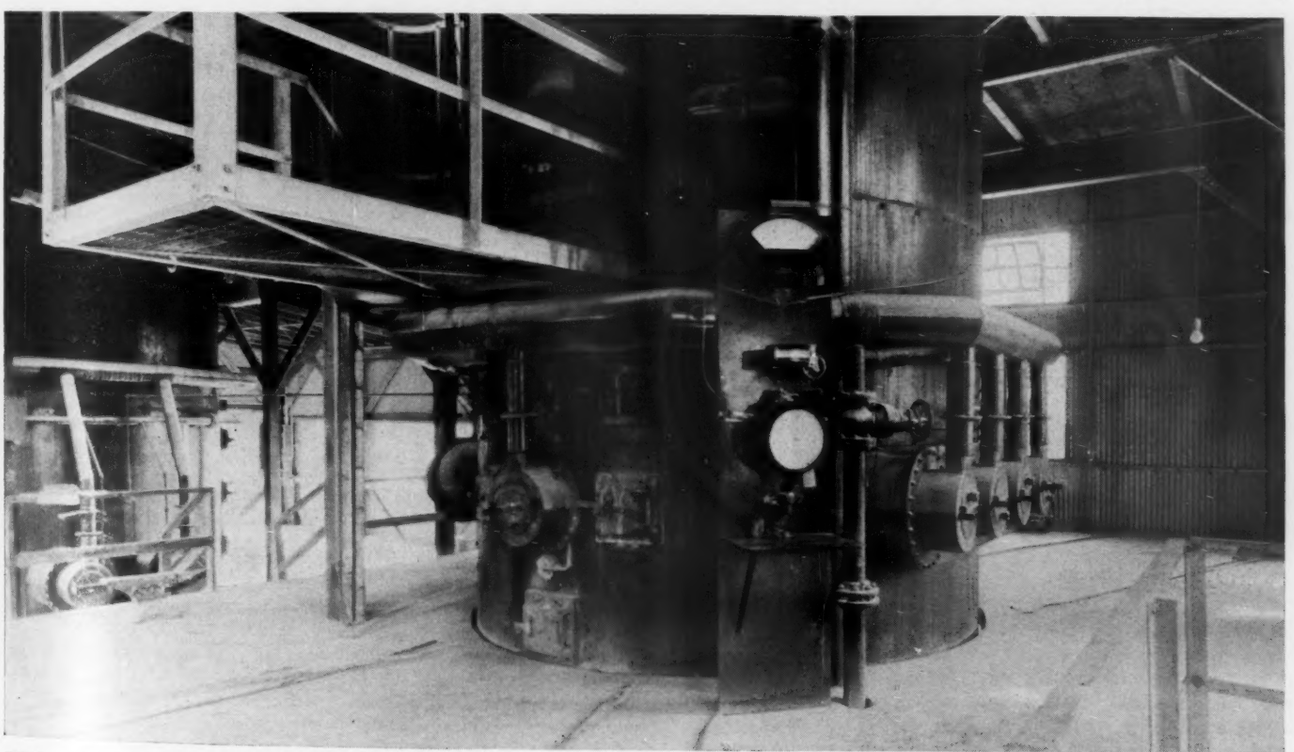
Provision for Trimming Kiln

When long kiln life is desired, it is important to properly trim a kiln when drawing lime, so numerous small poke hole doors are placed at all likely spots. Some of these may not be used for months, but when needed are a great convenience. These doors are distinctly a Glencoe development. They were first used in this plant probably twenty years ago, but now can be found on kilns widely scattered throughout the country.

A poke hole door one may consider a minor item, but it is far from being that. A door amply large to serve the purpose, but not too large; strong enough to be used for straightening of poking bars, resistant to warping and cracking of frames by heat; tight when hot and cold, is quite a development and an important link in the whole.

Kiln Draft

There are three fans on the kiln. The largest is the induced draft fan capable of producing 5 in. suction, but ordinarily operated at only about 2 in. The second is a CO_2 fan drawing some of the gas from the kiln,



Firing floor of the new kiln; note the instrument and control board, the numerous burners, poke holes, the much lower old kiln in the background

mixing it with air, and delivering this mixture at the burners. The CO_2 can be varied, and when the kiln is too hot as much as 20% may be in the blast, but ordinarily considerably less. However, there is always some, as without it not only would kiln repairs increase, but some of the lime would be overburned. The third fan is the air fan delivering air to the cooler. This fan is used only when the kiln is operated at capacities of around 50 tons.

It appears that operation is quite dependent upon power. However, if for some reason there would be none, the kiln could still make from 25 to 30 tons of lime per day.

Instrumental Control

One interesting feature of the kiln is the instruments. Standing at one point the fireman can raise or lower the gas supply and know exactly what change he has made. He sees on draft gauges the draft at the kiln top, or the draft in the hot zone, or the blast pressure on the burners, and he can control all. There is also a pyrometer indicating the temperature of the waste gases. None of these instruments is superfluous. All are used all the time.

One sees scattered through the country kilns that misuse rather than use natural gas. This plant is refreshingly different. Here is this new kiln, modern in all respects; then there is the old kiln also adapted to natural gas in a somewhat simpler but also quite satisfactory manner. Between the two the plant presents everything that a lime manufacturer interested in natural gas application to vertical kilns needs to know.

Great credit is due to Henry F. Greutzemacher of the Glencoe company, who supervised erection, and to Pat Lynch, who placed the plant in satisfactory operation. Also to such concerns as Stupp Brothers Bridge & Iron Works, the Alpha Tank Co. and St. Louis Structural Steel Co., which did most of the steel fabricating and erecting work; to the Sturtevant Blower Co., which furnished the fans; to the Foxboro Instrument Co. and the Hays Instrument Co., and the Andrew Manufacturing Co., which furnished the instruments.

Ohio Lime Company Starts $150,000 Rehabilitation

National Mortar and Supply Co., Gibsonburg, Ohio, has let contracts for extensive rebuilding and improvements to cost at least $150,000.

The company will erect three large bins for the storage of hydrated lime, two others for the storage of raw crushed lime and a lime pulverizing unit.

A wooden building now in use will be razed to make way for the new, modern, steel structure which will make it possible for cars to be loaded and unloaded under shelter. Contract for the work already has been awarded the firm of Arnold and Weigel, Woodville, Ohio.

Quarry Safety Competition

THE National Safety Competition for 1934, conducted by the U. S. Bureau of Mines for the "Sentinels of Safety" trophy donated by the *Explosives Engineer*, resulted as follows:

In the nonmetallic mineral group, first place was given to the La Salle mine of the Marquette Cement Manufacturing Co., Oglesby, Ill., which was operated through 105,376 man-hours without a lost-time accident.

In the group composed of quarries and open-cut mines, the winner was the Rogers City limestone quarry, Rogers City, Mich., operated by the Michigan Limestone and Chemical Co., which worked 727,503 man-hours in 1934 with no lost-time accidents. This quarry was given the highest award in this group in 1929, 1932 and 1933.

Among the nonmetallic mines the following were honorably mentioned:

Akron mine, Akron, N. Y., operated by the Certain-teed Products Corp.
Wampum mine, Wampum, Penn., of the Crescent Portland Cement Co.
Clarence Centre mine, Clarence Centre, N. Y., of the National Gypsum Co.
Independence mine, Independence, Mo., of the Missouri-Portland Cement Co.
Akron mine, Akron, N. Y., of the Universal Gypsum and Lime Co.
Lower Gypsum mine, Gypsum, Ohio, of the United States Gypsum Co.

In the group comprised of quarries and open-cut mines, the following-named operations were given honorable mention. All of these mines or quarries operated without a lost-time accident in 1934:

Billmeyer quarry, Bainbridge, Penn., operated by the J. E. Baker Co.
Inland limestone quarry, Manistique, Schoolcraft and Mackinac Counties, Mich., of the Inland Lime and Stone Co.
Fort Smith sandstone quarry, Fort Smith, Ark., operated by the Sebastian County Rock Crusher.
Mary Lee phosphate rock mine, Mulberry, Fla., of the Coronet Phosphate Co.
Mahoning iron ore mine, Hibbing, Minn., of the Mahoning Ore & Steel Co.
Dunwoody mine, Chisholm, Minn., of the Orwell Iron Co.
Krause No. 1 quarry, Columbia, Ill., of the Columbia Quarry Co.
La Salle quarry, Oglesby, Ill., of the Marquette Cement Mfg. Co.
Scranton mine, Hibbing, Minn., of the Hoyt Mining Co.
Cape Girardeau No. 2 quarry, Cape Girardeau, Mo., of the Marquette Cement Mfg. Co.
Reformatory quarry, Anamosa, Ia., operated by Iowa State Reformatory.
Naginey quarry, Naginey, Penn., of the Bethlehem Steel Co.
Buckeye Creek quarry, East Fultonham, Ohio, of the Pittsburgh Plate Glass Co.
Ruegg quarry, Ruegg, Mo., of the Missouri Portland Cement Co.
Winchester quarry, Winchester, Mass., of the General Crushed Stone Co.
Pen Argyl quarry, Pen Argyl, Penn., of the Bangor Fidelity Slate Co.
Ormrod quarry, Ormrod, Penn., of the Lehigh Portland Cement Co.
Union quarry, Mt. Wolf, Penn., of J. E. Baker Co.
Sagamore mine, Riverton, Minn., of the Sagamore Mining Co.
Leroy quarry, Leroy, N. Y., of the General Crushed Stone Co.
Akron quarry, Akron, N. Y., of the General Crushed Stone Co.
Biwabik mine, Biwabik, Minn., of the Biwabik Mining Co.
Kinney mine, Kinney, Minn., of the Republic Steel Corp.
Woodville quarry, Woodville, Ohio, of the Woodville Lime Products Co.
Glenford quarry, Glenford, Ohio, of the Central Silica Co.
Cowell quarry, Cowell, Calif., of the Cowell Portland Cement Co.
Fordwick quarry, Fordwick, Va., of the Lehigh Portland Cement Co.
Berkeley Nos. 5 and 6 quarry, Martinsburg, W. Va., of the North American Cement Corp.
York mine, Nashwauk, Minn., of the York Iron Mining Co.
Union Bridge quarry, Union Bridge, Md., of the Lehigh Portland Cement Co.
Fogelsville quarry, Fogelsville, Penn., of the Lehigh Portland Cement Co.
Plainville No. 4 quarry, Plainville, Conn., of Connecticut Quarries Co., Inc.
Glens Falls quarry, Glens Falls, N. Y., of the Glens Falls Portland Cement Co.
Auburn quarry, Auburn, N. Y., of the General Crushed Stone Co.
Brooksville quarry, Brooksville, Fla., of the Florida Portland Cement Co.
Martins Creek No. 4 quarry, Martins Creek, Penn., of the Alpha Portland Cement Co.
Plymouth mine, Wakefield, Mich., of the Plymouth Mining Co.
Middlefield No. 1 quarry, Middlefield, Conn., of the Connecticut Quarries Co., Inc.
Volunteer mine, Palmer, Mich., of the Palmer Mining Co.
Mitchell quarry (Lehigh Lime Co.), Indiana, Ind., of the Lehigh Portland Cement Co.
Nazareth quarry, Nazareth, Penn., of the Lone Star Cement Co.
Birmingham quarry, Birmingham, Ala., of the Lehigh Portland Cement Co.
Bennett mine, Keewatin, Minn., of the Bennett Mining Co.
Lone Star quarry, Greenport, N. Y., of the Lone Star Cement Co. of N. Y., Inc.
Union Furnace quarry, Aryone, Penn., of the American Lime and Stone Co.
Watertown quarry, Watertown, N. Y., of the General Crushed Stone Co.
Petoskey quarry, Petoskey, Mich., of the Petoskey Portland Cement Co.
New Castle quarry, New Castle, Penn., of the Lehigh Portland Cement Co.
Culbert quarry, Marion, Va., of W. F. Culbert & Sons.
Catskill quarry, Catskill, N. Y., of the North American Cement Corp.
Rockdale quarry, Williamson, Penn., of J. E. Baker Co.
Clinchfield limestone quarry, Clinchfield, Ga., of the Pennsylvania-Dixie Cement Corp.
Corsica mine, Elcor, Minn., of the Corsica Iron Co.
Steelton quarry, Steelton, Penn., of the Bethlehem Steel Co.
Thomaston limestone quarry, Thomaston, Me., of the Lawrence Portland Cement Co.
El Paso quarry, El Paso, Tex., of the Southwestern Portland Cement Co.
Dallas quarry, Dallas, Tex., of the Lone Star Portland Cement Co., Texas.
West Conshohocken quarry, West Conshohocken, Penn., of the Valley Forge Cement Co.
Dewey quarry, Dewey, Okla., of the Dewey Portland Cement Co.
Catskill quarry, Catskill, N. Y., of the Alpha Portland Cement Co.
Stockertown quarry, Stockertown, Penn., of the Hercules Cement Corp.

Digest of Foreign Literature

By F. O. Anderegg, Ph. D.
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Determination of Free Lime in Hardened Cement and Cement-Trass Mixtures as Well as Combined Lime in Lime-Trass Mixtures. This study has been carried out by V. Rodt of the State Testing Materials Laboratory at Berlin-Dahlem, using the modification of the Emley method worked out by Schläper and Bukowski (*Ber. d. eidg. Material-prüfungsanstalt in Zurich, No.* 63-1933). In this method ethylene glycol is used instead of alcohol and a much sharper and quicker end point is obtained. The results with this method check closely with those obtained by the Emley method and may be applied to hardened cements. With the latter the question of the water content of the cement must be considered and it was found that one might add a few drops of water to 50 cc. glycol without affecting the results. The loss on ignition of hardened cements dried over phosphorous pentoxide runs about 15%, so that the amount of water in a one gram sample would have no effect on the determination. To this weight of finely ground cement 30 to 50 ml. glycol are added in a stoppered flask, which is mechanically shaken in a water bath warmed to 65 or 70 deg. C. The solution is titrated with 0.1*N* benzoic acid in absolute alcohol using a mixed indicator made by dissolving 0.15 gram naphtholphthalein and 0.10 gram phenolphthalein in 100 of absolute alcohol. This changes from a blue to a red at the end point.

The cements or mixtures were stored in CO_2-free water for 1, 3 and 6 months and then crushed and dried over the pentoxide to constant weight. It was found that the amount of bound water reached a maximum at about 3 months. The free lime in cement-trass mixtures was as great as when no trass was present, even after six months of storage. With the blast furnace cements, however, a perceptible diminution occurred in the free lime during the first month. When the cement is stored in air the free lime is partly combined with CO_2. Rodt offers as explanation of the superior resistance of slag or trass cements over straight portland cement to sea water, the formation of a protective coating of slag or trass at the surface which hinders the contact between the attacking salts and the interior of the concrete. The assumption, so often seen in the literature, that it is the free lime in hardened portland cement which is attacked, because of lack of suitable method, has never been experimentally proved.

In mixtures of trass and lime, part of the latter is rapidly brought into combination, while the amount of combined water seems to remain constant. The strength does not increase at first as fast as the lime is brought into combination, and a poor correlation is found among different trasses between the strength and lime combination. Hence some other explanation should be sought.

(Comment: An explanation may be found in the change in physical state of calcium hydrosilicate gel with time. Such gels seem to undergo a slow shrinking or indurating with, probably, loss of water resulting in much greater cementing power. Such changes have been noted by the reviewer in portland cement.) *Zement* (1935). **24,** No. 7, p. 93.

Brownmillerite Cement. The discovery of the ternary compound between the oxides of calcium, aluminum and iron, C_4AF, by Brownmiller, has aided Prof. Ferrari in the understanding of certain improved cements he has been interested in for some time. He has been especially interested in the pozzuolanic or high silica cements obtained by mixing portland with active silicas. He had drawn a conclusion in 1919 based on work carried out in 1913 that with a A/F ratio of 0.64 a cement contained no binary compounds of alumina or iron oxide. F. likes to add a pyrite sinter to his raw mix and claims the following advantages obtained in the manufacture: The low melting point of the ternary compound means low burning temperature and saving of fuel. The cement sticks to the lining and affords it protection. The compound is very effective in bringing about the formation of the tri-calcium silicate so that the lime content may be maintained close to the theoretical, providing plenty of tri-silicate to give a vigorous reaction. The iron also seems to make the product more resistant to chemical attack. The cement is ground leaving a residue of 4 to 5% on the 176-mesh sieve and is mixed with one of the standard pozzuolanic materials. Gypsum is added and is thought to hasten the hardening reactions. The setting time begins, according to the Vicat needle readings, after 3 or 4 hours and is ended in 6 or 7. Tested according to the Italian standards the tensile strengths run for 3-, 7- and 28-day periods 500 to 640, 640 to 780, 780 to 925 lb. per sq. in. respectively; while the compressive values for similar periods are: 6400 to 7100, 8500 to 10,000, and 10,600 to 12,000 lb. per sq. in. Because of the high strengths, even in poor mixes, good correlation is obtained between the results from the mortar tests and concrete strengths. As compared with concrete made with standard portland cement the advantages claimed include: lower heat evolution during setting and hardening, much lower shrinkage and appreciably higher chemical resistance. A good workability is observed. On increasing the dicalcium silicate content, the setting time is slowed and also the rate of hardening, while the workability is adversely affected to a small extent. On the other hand, the heat of hydration and shrinkage are both reduced and the resistance to chemical attack still further increased. These advantages seem to lie largely in the absence of tricalcium aluminate, therefore the Brownmillerite cements are the best for mixing with pozzuolans. Only recently has this cement come into production and Prof. Ferrari hopes soon to make a complete investigation of this product. *Tonindustrie Zeitung* (1935) **59,** No. 44, p. 533.

A Contribution to the Study of Alite. K. Koyanagi has confirmed the most recent findings that tri-calcium silicate is the same as Tornebohm's "Alite." By replacing the alumina and iron oxide normally found in portland cement with other fluxes such as gypsum or fluorspar, a clinker very rich in alite was prepared. Its optical properties agreed closely with those found by F. E. Wright and Guttmann and Gille, while its X-ray spectrum was similar to that published by Brownmiller and by Guttmann and Gille. On grinding into cement with a water requirement of 25.3%, it had an initial set of 4 hours and 18 minutes and a final set of 5 hours and 33 minutes. Its tensile and compressive strengths rose from 570 and 9480 at three days to 840 and 13,780 p.s.i., respectively, for earth dry and pounded-in mixes. This would seem to indicate possible increases in quality of cement by raising the tri-silicate content. It remains to be determined, of course, how economical such a manufacture would be.—*Zement* (1934) **23,** No. 43, p. 633.

Setting Behaviour of Aluminous Cements at Different Temperatures. Samples of nearly pure monocalcium aluminate were suspended in water in a glass bottle provided with a long capillary so that the hydration could be followed. This method has been much used by Le Chatelier. A series of runs was made at different temperatures and it was found that after an initial period a rather rapid reaction occurred at low and at high temperatures with an intermediate zone where the rate fell off with temperature rise. Between 22 and 30 deg. C. the reaction is extremely sluggish. With commercial aluminous cement this interval is smaller and falls about 30 deg. The explanation lies in the different types of calcium aluminate and hydrated alumina crystals formed at different temperatures. L. Seailles reported these results to the 14th Congress of Industrial Chemistry in Paris, Oct., 1934. *Tonindustrie Zeitung* (1935). **59,** No. 33/34, p. 417.

Wisconsin Crushed Stone, Sand and Gravel Industries Code Is Now a Law

THE State of Wisconsin, which for many years has been a legislative and governmental laboratory, passed a new Recovery Act in 1935, to take the place of the one made obsolete by the failure of NIRA. Under this new law industries may write their own codes, subject to approval of the Governor. On August 27, the Governor approved No. 9 of such codes—that of the crushed stone, sand and gravel industries (there is no slag industry in Wisconsin).

In his report to the Governor, recommending approval of this code, the Administrator (a state officer appointed by the Governor) said: "The sale of sand and gravel in Wisconsin has fallen to 4,460,246 tons in 1933 from the peak production of 14,168,702 tons in 1929. This reduction in the production and in the value of crushed stone, sand and gravel in the last few years, and the existence of plants capable of producing more than is required even in normal times, has brought on a destructive price competition which has exacted a heavy economic toll. Wages have dropped to an extremely low level not sufficient to afford workers a fair standard of living. In some counties 25c per hour for common labor is prevalent.

"The provision for minimum wages and maximum hours of employment should result in a substantial increase in the rate of pay for many employes and in a substantial reduction in the hours of employment, and a resulting increase in the number of those employed.

"An investigation of income tax returns of eleven representative members of the industry shows that a total loss of $924,287.93 was sustained during the five year period between the end of 1929 and 1934.

"Provision has been made for determining the reasonable cost of production of the products of the industries and the code is designed to prevent sales below such cost and to prohibit discrimination against the customer buying under similar circumstances, in order to permit the industries to carry the burden of increased wage scale."

The code follows closely the original NRA code in definitions, labor provisions, rate of wages, etc. However, in view of the fact that it is the *first* such state code to become law *since* the collapse of NRA, certain parts are published here in full, for Wisconsin has often proved that its legislation is a forerunner of similar legislation in other states; and, presumably, this new state law has incorporated in it the results of experience under the old NRA code.

Administration

The state is divided into three districts.

Article VI, Section 2: Committees. (a) Code Authority. To effectuate the policies of the Act, a Code Authority is hereby constituted to administer this Code. The Code Authority shall consist of the following individuals to be appointed by the Governor:

(1) Two (2) members representing the crushed stone industry and two (2) members representing the sand and gravel industry from each district.

(2) One (1) representative of labor and one (1) representative of the consumer or the general public.

(b) The chairman and treasurer of the Code Authority shall be elected by the full Code Authority from its membership. Members of the Code Authority shall serve for the terms for which appointed.

(c) District Committees. The crushed stone, sand, and gravel marketers in each established district, in which they are marketing, shall elect, in the manner prescribed in Section 5 (c) of this Article, an even and like number from their respective industries consisting of not less than two (2) or more than six (6) of the district committee.

This committee shall be equitably representative of the small, intermediate, and large companies marketing within the district, with not more than one (1) representative from a single company, except that a marketer may may have more than one (1) but not more than three (3) representatives in order to give voting parity to the industry or industries represented by that marketer, or marketers.

Members of a district committee shall serve for one year from the effective date, or until their successors are elected for a like term.

Section 3. Duties of the Committee. (a) Duties of Code Authority. The Code Authority shall be the general planning, co-ordinating and administrative agency for the industries governed by this Code and shall adopt such rules and regulations as, in its judgment, and subject to the modification or disapproval by the Administrator, are necessary for its procedure and the proper administration of the Code.

Without limiting the foregoing, the Code Authority shall have the following specific powers, subject to disapproval or modification by the Administrator:

(1) To obtain from members of the industries, periodically, or as often as it may direct, reports on wages, hours of labor, conditions of employment, number of employes, production, shipments, sales, stocks, prices, and other matters pertinent to the provisions or operation of this Code, sworn or unsworn as it may specify, or as the Governor may from time to time require.

(2) To delegate to the district committee the authority to collect from members of the industries, in such districts, or divisions such information and data as may be necessary for such committees properly to administer this Code; provided, however, that such information and data shall be held as confidential information by such committees, except that such information and data shall be available to the Code Authority and the Administrator.

(3) To delegate to the trade associations of the industries governed by this Code or to such subcommittees or such other agents or agencies as it may designate such of the administrative powers as may practicably be performed by them, and properly to compensate them therefor; provided, however, that such delegation shall not relieve the Code Authority of responsibility, and provided further that in the performance of any such delegated functions, such trade associations, subcommittees, or other agencies shall comply with all applicable provisions of this Code.

(4) To keep accurate records and accounts of the expenses incident to the establishing and administering of this Code, and of doing such other things as it may have been, or may be, authorized or instructed by the Administrator to do; and to render from time to time such reports to the various committees and members of the industries as may in the judgment of the Code Authority seem proper.

(5) To provide for the collection at intervals of funds to cover these costs and expenses and to designate through what agency and in what manner they shall be collected.

(6) To collect and furnish to state agencies such statistical information as the Administrator may deem necessary for the purposes recited in the Act.

(7) To establish from its own membership an Executive Committee which, in the interim between meetings of the Code Authority, shall have all of the powers and authority of the Code Authority. This Executive Committee shall consist of six (6) members from the two industries governed by this Code, and shall be equally and equitably representative of such industries, and the representatives of labor and consumer or general public.

The members of the Executive Committee shall serve until their successors are elected.

(8) (a) To make such inquiries and investigations and to hold such hearings as to the operation of this Code upon the complaint of interested parties, or upon its own initiative, as may be necessary properly to administer the provisions of this Code.

(b) To appoint from its own membership a Trade Practice Compliance Committee charged with full responsibility for the handling of all trade practice complaints arising under Article VII. Without limiting the foregoing, the committee shall have the following specific duties:

(1) (a) To hear, adjust, or otherwise dispose of, in the first instance, trade practice complaints arising within the industries governed by the Code.

(b) If the Administrator upon appeal shall affirm the findings and conclusions of the Trade Practice Complaint Committee as to a violation of Article VII, said Administrator shall certify his decision, together with a copy of the findings and conclusions, to the Commission, Board, Agent, or body of the state or county, and such other political subdivision of the state or other awarding authorities that assent to the application of the Code or who are required by law to comply with the Code, with whom the offending member filed his bid or quotation, and thereupon the said Commission, Board, Agent, body, or other awarding authorities shall refuse to consider said bid or quotation, and it shall be treated by said Commission, Board, Agent, body or other awarding authorities as irregular and be rejected as such.

(c) Complaints to or by the Fair Practice Complaint Committee shall be made in writing and a copy thereof filed with the awarding authorities within 48 hours after the day set for the opening of bids and the Administrator shall certify the record to such awarding authority within 20 days after such time for opening of bids.

(2) To refer to the Administrator, the several district attorneys, or Attorney General, for legal action those trade practice complaints requiring such action.

(9) To appoint district committees in any district where committees are not elected pursuant to the provisions of this Code.

(10) To establish or designate an agency on planning and fair practice which shall co-operate with the Code Authority in developing fair inter and intra trade practices and industrial planning, including the regularization of employment and stabilization of employment for the industries.

* * * * *

Subsection 11 provides for a budget and its approval and the assessment of *all* members of the industry to pay the costs of code administration. Nonpayment is taken care of as follows:

(12) The Code Authority may, subject to the approval of the Administrator, appoint "field representatives," whose duty it shall be to make preliminary investigation of reported or suspected violations of, or noncompliance with, this Code.

(13) The Code Authority may withdraw the right of any member of the industries to display a certificate, as an evidence of participation in this Code, upon finding after a hearing duly called and noticed, that such member does not comply with the provisions, or any of them, of this Code; before such withdrawal shall become effective it shall have the approval of the Administrator who may, before giving his approval or disapproval, call and notice a hearing thereon.

* * * * *

(b) **Duties of District Committee.** The district committee shall administer the provisions of this Code in their district provided, however, that their acts be reviewed by the Code Authority and subject to their disapproval or modification. The acts of such district committees may be reviewed and disapproved or modified by the Administrator.

The district committee shall maintain the authoritative list of marketers in each district who are complying with all provisions of the Code. The district committee shall not continue the name of any marketer on the list who has failed to pay his equitable assessment as determined by the Code Authority in accordance with the provisions of the Code.

* * * * *

Section 5 covers voting rights and is interesting chiefly because it includes the same distinction between large and small producers that was a part of the NRA code, when electing members of the district committees —that is, weighted voting according to tonnage. Section 5 covers the right of appeal to the Code Authority.

* * * * *

Section 7. Arbitration. Complaints or controversies not involving labor disputes, affecting consumers interests, disputes between members or groups outside of the industries, which cannot be satisfactorily settled by the Code Authority may, with the consent of the interested parties, be referred to an arbitration board composed of equal representation from each of the groups involved in the complaint or controversy, together with three neutral arbiters selected by the appointed members of the arbitration board. The decision of the arbitration board shall be final. Labor disputes (with the exception of wage claims) shall be referred to the Wisconsin Labor Board.

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Article VII
Trade Practices

Section 1. Unfair Methods. The following acts or practices constitute unfair methods of competition or unfair trade practices for members of the industries and are prohibited.

(a) **Secret Rebates.** (1) To make secret prepayment of transportation charges or permit the payment or allowance of secret rebates, refunds, credits, or unearned discounts, whether in the form of money or otherwise, or extending to certain purchasers special service or privileges not extended to all purchasers under like terms and conditions.

(2) For a member of the industry to make secret and confidential disclosure of a price which he proposes to file (as required by Section 2, Article VII) at a subsequent date; to sell products of the industries for a particular project to any purchaser or purchasing body at a price which differs from that which was on file and effective at the time bids were received on a given project.

(3) Employing, without the approval of the Code Authority as to a fair remuneration, which shall not be less than the prevailing reasonable cost, purchaser's equipment, personnel, or services, either direct or through an assignee.

(4) To sell to dealers at whole or under special conditions, other than to those who possess warehouse facilities and other equipment commensurate with the needs of the market which they serve, who maintain an office open to serve the public throughout the entire year, and who constantly warehouse an adequate line of material in sufficient quantity and variety to supply the normal needs of the trade from their own stock.

(b) **Contract Interference.** To interfere wilfully with anyone by any means or device whatsoever, in any existing contract or order between a seller and a purchaser in or concerning the production, manufacture, transportation, purchase, or sale of any industry product or the performance of any contractual duty or service connected therewith, with the intent and/or effect of thereby destroying or appropriating in whole or in part the property or business of another engaged in the industries governed by this Code.

Defamation of competitors, misrepresentation, misbranding, commercial bribery, lump-sum bidding, contingent selling, responsibility for jobbers and distributors are covered in clauses the same or very similar to those in the NRA code.

* * * * *

Section 2. Cost Determination. (a) The Code Authority shall establish, subject to the approval of the Administrator, a standard uniform accounting and costing system or method for each industry governed by the provisions of this Code.

(b) When approved by the Administrator, full information concerning such uniform standard system or method shall be distributed by the Code Authority to all members of the industries. Thereafter, each member shall adhere to the standard uniform system or method for the industry or industries in which he is engaged to the extent of incorporating in his calculation of cost all of the elements prescribed by such system or method.

(c) No member of the industries producing or selling within a district shall price, sell, or offer to sell any products below his reasonable cost. Such reasonable cost shall be computed in accordance with the standard uniform accounting and costing system or method for the industry or industries in which the member is engaged, and shall include all items of cost, both direct and indirect, exclusive of net profit or any return on invested capital.

(d) Any district committee may, if it so elects, and subject to the approval of the Code Authority, adopt for members of the industries producing or selling within that district the policy prescribed in paragraph (e) of this section.

(e) In any district where this paragraph is adopted, each member of the industry producing or selling within the district shall file with a confidential and disinterested agent of the Code Authority not less than five (5) days in advance of the effective date thereof, all prices computed in accordance with the standard uniform accounting and costing systems or methods, terms, and conditions of sale which shall be f. o. b. plant location, or delivered, or both, as may be directed by the District Committee. Such prices, terms, and conditions of sale shall continue in effect until other prices, terms, and conditions of sale have been duly filed as herein provided. Said agent shall immediately cause copies of all such prices, terms, and conditions of sale filed with him to be distributed amongst the members of the industries producing or selling within the district, and to be made available for public information.

(1) No provision contained herein shall be construed as preventing any member of the industry producing or selling within a district from meeting, as of their effective date, the prices, terms, and conditions of sale filed as herein provided by any other member.

(2) Except as provided in the foregoing, no member of the industry producing or selling within a district shall deviate from the prices, terms, and conditions of sale filed by him as herein provided.

(3) In the event similar low bids are submitted for the same proposal by more than one bidder, awarding agencies may award the contract by drawing.

(f) In any marketing area where products of the industries are marketed under similar conditions, the Code Authority may, upon request after a proper survey, and subject to the approval of the Administrator, establish for the area minimum reasonable cost below which products of the industries shall not be sold.

Section 3. Uniform Terms of Sale. In each district the district committee may establish, subject to the aproval of the Code Authority, terms of sale uniform within each district. Such terms shall be binding upon all members selling in that district.

Section 4. Uniform Credit Practices. In each district, the district committee may establish, subject to the approval of the Code Authority, credit practices uniform within such district. Such practices shall be binding upon all members selling in that district.

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Article VIII
Modification

Section 1. Statutory Provisions. This Code and all the provisions thereof are expressly made subject to the right of the Governor to modify, amend or repeal in accordance with the provisions of the law.

Section 2. Amendments. This Code, except as to provisions required by the Act, may be modified on the basis of experience or changes in circumstances, such modifications to be based upon application to the Governor, and such notice and hearing as he shall specify, and to become effective upon approval of the Governor and after publication thereof.

* * * * *

Article X
Enforcement and Penalties

Section 1. Upon the approval of this Code by the Governor and its publication pursuant to the provisions of Chapter 182, Laws of Wisconsin of 1935, this Code, and any and all rules and regulations made pursuant thereto, shall be complied with and adhered to by all members of the crushed stone, sand and gravel industry.

Section 2. This Code, upon approval and publication as hereinbefore provided, shall be in full force and effect for the term provided by Chapter 182, Laws of Wisconsin of 1935, or any extension thereof duly enacted, unless sooner modified or terminated by the Governor in the manner provided by law.

Section 3. For the purposes of determining whether or not this Code operates to effectuate the purpose of Chapter 182, Laws of Wisconsin of 1935, the Governor shall have all the powers provided in said Chapter, and more particularly, the powers provided in Section 110.06 (3), and no person shall fail to comply with a subpoena issued pursuant to Section 110.06, nor refuse to be sworn, or to be examined or to answer a proper question or produce a pertinent document when ordered to do so by the Governor or his authorized agent. Likewise, no person shall refuse, neglect or fail to render any report or answer, required under Section 110.06 at such time and in such manner as the Governor or his authorized agent may prescribe. Likewise, no person shall refuse, neglect, or fail to submit, for the purpose of inspection or copying, any document demanded under said section, nor wilfully make any false entry or statement in any report required or document demanded under said section; all as provided in Subsection 6 of said Section 110.06, Wisconsin Statutes, and violations of the provisions of said subsection 6 of said Section 110.06, shall be subject to the penalties provided in Subsection 7 of Section 110.06.

Section 4. Any violation of this Code, after its approval and publication, or any provisions thereof, may be prevented and restrained as provided for in Subsection 5 of Section 110.04, Chapter 182, Laws of 1935, which reads as follows:

"The several circuit courts of the state are hereby vested with jurisdiction to prevent and restrain violation of any code of fair competition and business practices approved under this section and it shall be the duty of the several district attorneys in their respective districts, under the direction of the Attorney General to institute proceedings in equity to prevent and restrain such violations. Any trade or industrial association or group or any person who is a member thereof who is damaged by a violation of a code may petition the circuit court having jurisdiction to restrain such violations."

Shortage of Relief Labor!

Lee County, Iowa, is reported to be suffering a shortage of labor to operate quarries as relief projects. It's one consolation to commercial quarry operators that hand loading in quarries is not, never has been, and never will be a popular pastime.

WPA Takes Over Agstone Business of Wisconsin

LAST YEAR the Wisconsin Emergency Relief Administration with federal money produced 600,000 tons of agricultural limestone which it sold for 55c per ton. This year the state administrator of WPA, which succeeded the FERA, expects to produce 2,000,000 tons. Labor cost of producing and handling will be paid with WPA funds. Cost of material equipment and other expenses of production and distribution will constitute price of the lime to the farmer, he says.

TRAFFIC and TRANSPORTATION

Proposed Rate Changes

THE FOLLOWING are the latest proposed changes in freight rates up to and including the week of September 14.

New England

36713. **Sand,** naturally bonded molding, in open top or closed cars, (See Note 3), provided that orders will not be accepted for closed and open top cars of less marked capacity than 60,000 and 80,000 lb., respectively, from stations in the Albany molding sand district to destinations in Canada. Reason—To adjust rates on sand, naturally bonded molding, to points in Canada so as to bring them in line with adjustment at Niagara Frontier, prescribed by I. C. C. Docket 22907.

Trunk

33877 (Sup. 1). **Crude fluxing limestone,** C. L., from Thomasville, Bittinger and York, Penn., to Bridgeton, N. J., $1.70 per net ton, subject to emergency charge.

Sup. 1 to 33888. **Stone,** viz.: Fire, Ganister, not ground, C. L., (See Note 2), from Cumberland, Md., and Berkeley Springs, W. Va., to Sandusky, O., $2.90 per net ton, subject to emergency charge.

33926. **Stone,** crushed, coated with tar, oil, asphaltum or similar bituminous materials,* in open top equipment, in straight carloads, (See Note 2), from Bound Brook, N. J., to Pennington, Glen Moore, Hopewell, N. J., $1.03; Princeton, N. J., $1.33, and Atlantic City, N. J., $1.63 per net ton, subject to emergency charge.

33928. **Pulverized limestone,** C. L., minimum weight 60,000 lb., from Nazareth, Penn., to Somerville, Delaware, N. J., Scranton, Alford, New Milford, Penn., Binghamton, N. Y., Columbia, Augusta, Sussex, Belvidere, N. J., and various rates ranging from 85c to $1.70 per net ton, subject to emergency charge.

33929. **Stone, crushed, slag, gravel and/or sand,** coated with oil, tar or asphaltum,* in open top equipment, carload, (See Note 2), from Martinsburg, W. Va., to New Cumberland, W. Va., $1.89 per net ton, subject to emergency charge. Proposed rate is fairly comparable with rates from Martinsburg to Wheeling, W. Va., Carnegie, McDonald, Penn., etc.

33941. **Sand** (other than ground or pulverized), in closed cars, or in tank cars, C. L., **sand,** naturally bonded moulding, in open top cars, closed cars, or in tank cars, C. L., (See Note 3). Orders will not be accepted for closed or open top cars of less marked capacity than 60,000 lb. and 80,000 lb., respectively, from Baltimore, Md., to Manville, N. J., $1.70 per net ton, subject to emergency charge.

33947. **Sand** (other than ground or pulverized and other than naturally bonded molding sand), C. L., (A) in open top cars, (B) in closed equipment, (See Note 2), from McConnellsville, Blossvale and Humaston, N. Y., to Springfield, Mass., (A) $2.05 and (B) $2.25 per net ton, subject to emergency charge.

33954. **Refuse moulding sand,** in open top equipment, C. L., (See Note 2), from Uniontown, Penn., to Grafton, W. Va., 90c per net ton, subject to emergency charge, and to expire September 30, 1936, class rate effective October 1, 1936.

33958. **Silica sand,** C. L., (See Note 2), from Trenton, N. J., to Georgetown, Ont. (Canada), $3.70 per net ton, subject to emergency charge. Proposed rate is comparable with rate from Mapleton, Penn.

33958 (Sup. 1). **Silica sand,** C. L., (See Note 2), from Berkeley Springs, Great Cacapon and Hancock, W. Va., to Georgetown, Ont. (Canada), $3.70 per net ton, subject to emergency charge.

33970. **Limestone,** ground or pulverized, carload, minimum weight 60,000 lb., from Buffalo, N. Y., stations to stations on the L. & N. E. R. R. West Penn. Palmerton, Slatington, Portland, Penn., Columbia, Lewisburg, N. J., Alba, Pine Island, N. Y., Nazareth, Bangor, Saylorsburg, Bath, Bethlehem, Penn., and various rates ranging from $2.35 to $2.55 per net ton, subject to emergency charge.

33970 (Sup. 1). **Limestone,** ground or pulverized, C. L., minimum weight 60,000 lb., from Buffalo, N. Y., to Summit Hill, Penn., $2.35 per net ton plus additional charge $12.50 per car, and from Blakeslee, N. Y., to stations on the L. & N. E. R. R. rates ranging from $1.95 to $2.05 per net ton, subject to emergency charge.

33973. Publish switching charge of $6.30 per car on **sand,** between connection with the New York State Rys. at Oak Street, Rochester, N. Y., and private sidings located in Group "E" of the Rochester switching limits.

33974. **Stone, natural** (other than bituminous asphalt rock), crushed, C. L., (See Note 2), from Catskill, N. Y., to N. Y. O. & W. Ry. stations, Firthcliffe to Burnside, N. Y., incl., $1.20; Middletown to Summitville, N. Y., incl., $1.30; Ellenville to High Falls, N. Y., incl., $1.40; Cottekill to Hurley, N. Y., incl., $1.50; Wurtsboro to St. Josephs, N. Y., incl., $1.40; Monticello, N. Y., $1.50; Mountaindale to Liberty, N. Y., incl., $1.40; Parkville to Hortons, N. Y., incl., $1.50, and Chiloway to Cadosia, N. Y., incl., $1.60 per net ton, subject to emergency charge.

33980. **Fluxing stone,** C. L., and **Dolomite,** crude or raw, C. L., (See Note 1), to Alley, W. Va., from Engle, Martinsburg, W. Va., Stephens City, Va., $2.60 per gross ton on fluxing stone, and from Strasburg Junction, Va., $2.63 per gross ton on fluxing stone, and from Millville, W. Va., $2.92 per gross ton on crude or raw dolomite, subject to emergency charge.

33985. **Sand** (other than ground or pulverized), in closed cars, or in open top cars with tarpaulin or other protective coverings, carload; **sand,** naturally bonded molding, in open top or closed cars, carload, (See Note 2), from Irvine Mills, N. Y., to Hamilton, Ont., $2.45 per net ton, and to St. Catharines, Ont., $2.10 per net ton, subject to emergency charge.

M-3431. To cancel Group 28 rates, published in Agent Curlett's I. C. C. No. A-452, on **crushed or broken stone** from trunk line territory to C. F. A. territory.

33997. **Limestone,** crushed, screened, ground or pulverized, C. L., minimum weight 60 000 lb., from Wingdale, N. Y., to Tuckahoe, N. Y., $1.05 per net ton, subject to emergency charge.

33999. **Ganister rock,** not ground, C. L., (See Note 3), from Barree, Brooks Mills, Flowing Springs, Harbison-Walker No. 16, Hannah, Huntington, Madley, Moores Mills, Mt. Union, Port Matilda, Wolfsburg, Penn., and Cumberland, Md., to Economy, Penn., $1.76 per net ton, subject to emergency charge.

34000. **Slag,** C. L., (See Note 3), from Troy, N. Y., to stations on the Boston & Albany R. R., Central Vermont Ry., D. L. & W. R. R., Erie R. R., L. & N. E. R. R., L. V. R. R., N. Y. N. H. & H. R. R., N. Y. O. & W. Ry., and Rutland R. R. rates ranging from 90c to $2 per net ton, subject to emergency charge.

Central

43968. To establish on **core sand,** carload, from Vassar, Mich., to London, Ont., 246c net ton. Proposed rate is same as published by P. M. Ry. from Juniata, Mich.

43971. To establish on (a) **sand,** naturally bonded moulding, in all kinds of equipment, carload; **sand** (except naturally bonded moulding; ground or pulverized sand) in closed equipment, carload; (b) **sand,** ground or pulverized, in all kinds of equipment, carload; (c) **sand** (except naturally bonded moulding; ground or pulverized sand) in open top equipment, carload. (See Note 3.) Orders will not be accepted for closed and open top cars of less marked capacity than 60,000 lb. and 80,000 lb., respectively. From Evansville, Ind., group to Appleton, Wis. (a) 300c, (b) 330c, (c) 300c. To Brillion, Wis., (a) 300c, (b) 330c, and (c) 300c. Ex parte 115 emergency charges in addition.

44026. To cancel present rate of $1.89 per net ton on **stone, ballast,** carload, from Bentley, O., Crescentdale, Edenburg, Hillsville, New Castle, New Castle Jct., Walford and Wampum, Penn., to Clarion, Holden and Strattonville, Penn., via P. & L. E. R. R., Youngstown (N. Y. C. Jct.), O., N. Y. C. R. R. (west), Andover, O., Sutton, Penn., and L. E. F. & C. R. R., published in Item 1330 of P. & L. E. R. R. Tariff I. C. C. 3167, account obsolete, class rates to apply in lieu thereof.

44032. To establish on (A) **sand,** naturally bonded moulding, in all kinds of equipment, carload; sand (except naturally bonded moulding; ground or pulverized sand) in closed equipment, carload; (B) sand, ground or pulverized, in all kinds of equipment, carload; and (c) sand (except naturally bonded moulding; ground or pulverized sand), in open top equipment, carload, (See Note 3). Orders will not be accepted for closed and open top cars of less marked capacity than 60,000 lb. and 80,000 lb., respectively, from points located in the following groups: Group 11, Canton, O., group; group 16, Southern Ohio group; group 21, Sandusky, O., group, and group 22, Oil City, Penn., group, to points in Wisconsin, located in Extended Zone C territory, viz.: Appleton, Beaver Dam, Beloit, Cudahy, Edgerton, Evansville, Fond du Lac, Ft. Atkinson, Grafton, Green Bay, Horicon, Lake Mills, Madison, Menasha, Neenah, Oshkosh, Pt. Washington and So. Milwaukee, Wis., rates on basis of mileage scale prescribed in I. C. C. Docket 22907 (industrial sand cases).

44042. To establish on **slag,** commercial crushed, in open top cars, carload, from Toledo, O., to West Unity, O., 85c per net ton.

44045. Cancels W. D. A. 41741—To establish on **limestone,** unburnt, ground or pulverized, carload, minimum weight 60,000 lb., from northern Ohio points located in Group 1, viz., Genoa, Gibsonburg, Maple Grove, Martin, Narlo, Woodville, O., etc., to Rochester, Geneva and Syracuse, N. Y., and points taking same rates, in cents per net ton, to Rochester, N. Y., 245; Geneva, N. Y., 255; Syracuse, N. Y., 275, being proposed rates, Gibsonburg, O., used as representative origin point.

44054. To establish on **sand** (except naturally bonded moulding; ground or pulverized), C. L., (See Note 3). Orders will not be accepted for closed and open top cars of less marked capacity than 60,000 lb. and 80,000 lb., respectively, from Grand Haven, Muskegon and Rosy Mound, Mich., to Uniontown, Penn., 310c per net ton.

44068. To establish on **crushed stone** and **stone screenings,** in open top cars, C. L., from Marion, O., to Delaware, O., 50c per net ton. Route: Via P. R. R. direct.

44127. To establish on **sand, refuse grinding,** C. L., (See Note 3), Toledo (Rossford), O., to Washington, D. C., 400c per net ton.

44130. To establish on **slag,** crushed or crushed commercial (not granulated) in open top cars, C. L., (See Note 3), Jackson, O., to Henderson and Gallipolis, W. Va., 120c net ton.

44135. To establish on **crushed stone,** C. L., (See Note 3), Keeport, Ind., to Alexandria, Ind., 95c per net ton.

44136. To establish on **crushed stone,** in open top cars, C. L., (See Note 3), Lewisburg, O., to P. R. R. stations, viz.: (Rates in cents per net ton.) To Eaton, Ohio, 80; Camden, Ohio, 85; Somerville, Ohio, 85; Collinsville, Ohio, 85; Seven Mile, Ohio, 85; Hamilton, Ohio, 85; Rialto, Ohio, 85; Grainthorpe, Ohio, 90.

Route—Via Cin. Nor. R. R., North Manchester, Ohio, thence P. R. R.

44161. To establish on **limestone,** unburned, agricultural (in bulk in open top cars), and **screenings,** agricultural limestone, in open top cars, C. L., from Spore, O., to Burton and Painesville, O., 125 and 115c per net ton, respectively. Route—Via N. Y. C. R. R. direct to Painesville and via N. Y. C. R. R., Fostoria, B. & O. R. R. to Burton.

44162. To establish on **agricultural limestone,** in open top cars, C. L., from Marion, O., to Painesville, O., 125c per net ton.

44166. (Cancels W. D. A. 42323, 42186 and 42656)—(a) To establish on **limestone,** unburnt, ground or pulverized, C. L., minimum weight 60,000 lb.

*Note—The oil, tar and/or asphaltum not to exceed 10% by weight of the commodity shipped, the shipper to so specify on shipping orders and bills of lading.

Note 1—Minimum weight marked capacity of car.

Note 2—Minimum weight 90% of marked capacity of car.

Note 3—Minimum weight 90% of marked capacity of car, except that when car is loaded to visible capacity the actual weight will apply.

(b) To revise commodity description and rates on **agricultural limestone,** in box cars, C. L., minimum weight 50,000 lb.; **ground or pulverized limestone** and **stone dust,** C. L., from points in Northern Ohio, located in Group 1 (Gibsonburg, Woodville, Carey, Genoa, etc.); also West Columbus and Marble Cliff, O., to points in states of Pennsylvania, New York and West Virginia, rates on basis of carriers' scale prescribed by the Interstate Commerce Commission in I. C. C. Docket 25220. (Representative proposed rates in cents per net ton.)

From Gibsonburg, Carey, Genoa, Martin and Woodville, Ohio, to Pittsburgh, Penn., 195; Buffalo, N. Y., 215; Gauley Bridge, W. Va., 235; Wheeling, W. Va., 185; Mt. Pleasant, Penn., 215; Dunkirk, N. Y., 205.

From Marble Cliff and West Columbus, Ohio, to Pittsburgh, Penn., 185; Buffalo, N. Y., 235; Gauley Bridge, W. Va., 195; Wheeling, W. Va., 165; Mt. Pleasant, Penn., 205; Dunkirk, N. Y., 215.

44183. To establish on **stone,** crushed, coated with oil, tar or asphaltum* in open top equipment, C. L., from Erie, Penn., to Conewango, N. Y., 128c per net ton. Route —Via N. Y. C. R. R., Dunkirk, N. Y., Erie R. R.

44182. (Cancels W. D. A. 43912)—To establish on **dolomite,** roasted (refractory dolomite, in granular form, treated or untreated, clinkered and/or burned to a dead state), C. L., from Bettsville, Maple-Grove-Narlo and Woodville, O. (Rates in cents per net ton.)

To Grafton, W. Va., 209; Lancaster, O., 169; Muncie, Ind., 210; Wellsboro, Penn., 265; Zanesville, O., 169; Charleston, W. Va., 194; Dunkirk, Ind., 210; Alexandria, Ind., 210; Marion, Ind., 210; Hartford City, Ind., 210; Vincennes, Ind., 234; Newark, O., 144; Cambridge, O., 169; Niles, O., 144; Morgantown, W. Va., 209; Clarksburg, W. Va., 209; Fairmont, W. Va., 209; Parkersburg, W. Va., 169; Arnold, Penn., 169; Jeannette, Penn., 169; Belle Vernon, Penn., 169; Lancaster, N. Y., 209.

44210. To establish on **sand** (except naturally bonded moulding; ground or pulverized sand) in open top equipment, C. L., from Fairport Harbor and Painesville, O. (Rates in cents per net ton.)

To following Pennsylvania points: Adamsburg Mine, 150; Bruceton, 140; Confluence, 170; Connellsville, 160; Durant City, 150; Dunbar, 160; Foxburg, 140; Frisco, 120; Gratztown, 150; Indian Creek, 160; Jones Mills, 170; Kane, 150; Keystone, 185; Leakrone, 160; Mt. Jewett, 150; Murdock, 185; Mill Run, 160; Niverton, 185; Rockwood, 170; Stoyestown, 185; Standard, 160; Snowden, 140; Uniontown, 160; Washington, 150.

To following West Virginia points: Elm Grove, 150; Fairmont, 185; Morgantown, 170; Sistersville, 170; Wheeling, 150; Moundsville, 150.

44247. To establish on **sand** (other than naturally bonded and ground or pulverized) in open or closed cars, carload. (See Note 3). Orders will not be accepted for closed and open top cars of less marked capacity than 60,000 lb. and 80,000 lb., respectively.

To	(1)	(2)	(3)	(4)
Algoma, Wis.	145	180	115	150
Burlington, Wis.	125	160	135	170
Fond du Lac, Wis.	135	170	135	170
Grafton, Wis.	115	150	125	160
Madison, Wis.	135	170	170	190
Menasha, Wis.	145	180	125	160
New Holstein, Wis.	135	170	125	160
Oshkosh, Wis.	135	170	125	160
Sheboygan, Wis.	125	160	115	150
Two Rivers, Wis.	135	170	105	140
West Bend, Wis.	115	150	135	170

(1) From Muskegon, Mich., Group, open cars.

(2) From Muskegon, Mich., Group, closed cars.

(3) From Manistee, Mich., Group, open cars.

(4) From Manistee, Mich., Group, closed cars.

44248. To establish on **crushed stone and crushed stone screenings,** in bulk in straight or mixed carloads, in open top cars, from White Sulphur and Scioto, O., to Adams Mills, Dover, Senecaville and Walhonding, O., 100c, 125c, 125c, and 105c per net ton, respectively. Routing:

Adams Mills—C. C. C. & St. L.—Columbus —P. R. R.

Dover—C. C. C. & St. L.—Grafton—B. & O.; C. C. C. & St. L.—Columbus—P. R. R.

Senecaville—C. C. C. & St. L.—Columbus —B. & O.

Walhonding—C. C. C. & St. L.—Crestline —P. R. R.

44253. To establish on **dolomite,** roasted (refractory dolomite, in granular form, treated or untreated, clinkered, and/or burned to a dead state), carload, from Durbin, O., to Johnstown, Penn., 234c per net ton.

44254. To establish on **agricultural limestone, crushed stone,** crushed stone screenings, carload, loaded in open top cars only, from Carey, O., to Akron Water Works Switch, Darrowville, Hugo and Northfield, O., 125c net ton. Proposed route: Via Nor. Ohio Ry., Copley Jct., O., A. C. & Y. Ry., Mogadore, O., W. & L. E. Ry., Cleveland, O., N. Y. C. R. R.

44255. To establish on **sand,** viz., **col. A. Sand,** naturally bonded moulding, in all kinds of equipment, carload; sand (except naturally bonded moulding; ground or pulverized sand) in closed equipment, carload; **col. B: Sand,** ground or pulverized, in all kinds of equipment, carload, and **col. C: Sand** (except naturally bonded moulding; ground or pulverized sand), in open top equipment, carload, (See Note 3). Orders will not be accepted for closed and open top cars of less marked capacity than 60,000 lb. and 80,000 lb., respectively, from Milwaukee, Wis., to points in Michigan.

Proposed rates in cents per ton of 2000 lb. Representative destinations in Michigan.

	Col. A.	Col. B.	Col. C
Bancroft	190	209	170
Battle Creek	180	198	145
Bay City	200	220	185
Detroit	210	231	200
Flint	190	209	170
Grand Haven	140	154	100
Greenville	160	176	125
Jackson	190	209	170
Kalamazoo	170	187	135
Lansing	180	198	145
Mount Clemens	220	242	215
Muskegon	140	154	100
Owosso	180	198	145
Pontiac	200	220	185
Port Huron	230	253	230
Rochester	210	231	200
Saginaw	190	209	170
Grand Rapids	150	165	115

44258. To establish on **sand** (blast, engine, foundry, glass, loam, moulding or silica), carload, from Massillon, O., to London, Ont., 334c; from Howard, Layland and Zanesville, O., to Fergus, Ont., 474c per net ton, subject to provisions of the emergency tariff.

Southern

9304. To establish rates from LaSalle, Oglesby, Ill., and Marquette, Mo., to all destinations in Southern Freight Association territory on shipments of **Cemcrete** (a concrete mixture consisting of cement and sand or of cement, sand and gravel, the amount of cement in the mixture not to exceed, in any case, 25%), in paper sacks in mixed carloads with hydraulic, natural or portland cement on the following basis: (a) Apply to the actual weight of the Cemcrete the carload rate on cement. No minimum weight to be observed on Cemcrete. (b) Apply to actual weight of the cement (other than that in the mixture), the carload rate on cement, observing the minimum weight on cement.

9350. To establish rate of 105c per net ton on **sand and gravel,** in straight or mixed carloads, (See Note 3), from Whigham to Fayette, Ala., in lieu of present rate of 130c per net ton. The proposed rate to expire with completion of movement, and expiration date to be determined before publication is made.

9404. To revise the rates on **bituminous rock,** crushed or ground, carloads, as described in S. F. T. B. Tariff 196-C, I. C. C. 1575, from, to and between points on the G. M. & N. R. R. to be on the trunk line scale.

9415. **Crushed stone and slag,** from Rocky Point, Va., to South Boston and News Ferry, Va. To establish rate of 125c per net ton in straight or mixed carloads, (See Note 3). (See Notes 1 and 2, page 13, S. F. T. B. Tariff 611C, I. C. C. 1825, from Rocky Point, Va., to South Boston and News Ferry, Va.)

9468. To establish a rate of 130c per net ton (not subject to Tariff of Emergency Charges) on **stone, crushed,** C. L. (See Note 3), from Columbia and Cayce, S. C., to Jacksonville, Fla., superseding present rate of $1.60 per net ton. Proposed for the purpose of enabling the rail lines to compete from Columbia and Cayce, S. C., with the water movement from the Hudson River (New York) section.

9472. To establish rates on road building material, viz., **slag, chert, sand, gravel, stone screenings and/or broken, crushed or ground stone** (including crushed natural asphalt stone) to which have been added oil, tar, lime, and/or asphalt in amount to form more than 2%, but not more than 9% of the whole mixture, in carloads, (See Note 3), from Birmingham, Ala., and group points to points in Missouri north of the line of the St. L.-S. F. Ry., St. Louis, Mo., to Kansas City, Mo., and points in W. T. L. territory, except points in the states of Kansas and Missouri on the south of the St. L.-S. F. Ry., St. Louis to Kansas City, Mo. The proposed rates are based on a scale ranging from 220c for 200 miles; 260c for 290 miles; 290c for 400 miles; 335c for 500 miles; 370c for 600 miles; 395c for 680 miles; 440c for 800 miles; 470c for 890 miles, and 520c per net ton for 1010 miles.

Western

C-11-14. **Cemcrete** (paper sack containing certain percentage of cement and balance sand and gravel) in mixed carloads with cement. Minimum weight 50,000 lb., from La Salle-Oglesby, Ill., and Cape Girardeau, Mo., to points of destination in Central Freight Association, Western Trunk Line, Southwestern and Southeastern territories. Proposed, to apply cement rates on these packages of cemcrete in mixed carloads with cement.

C-41-101. **Stone,** crushed, C. L., (See Note 3), but not less than 50,000 lb., from Dell Rapids, S. D., to Imperial, Neb. Rates: Proposed, 320c.

C-41-103. **Stone,** crushed, **chatt, gravel** and **sand,** coated with oil, tar or asphalt, as described in W. T. L. Tariff 91-G, S. W. L. Tariff 162-I, Mo. Pac. Tariff 6172 and other agency and individual lines' issues. From Pixleys, Mo., to stations in Missouri and Kansas. Proposed—add Pixleys, Mo., on Kansas City basis the same as presently in effect on sand, gravel and crushed stone, i.e. rates from Pixleys to be based on Kansas City mileages.

D-41-104. (A) **sand,** naturally bonded moulding; in all kinds of equipment, carloads. (B) **Sand,** ground or pulverized, in all kinds of equipment, carloads. (C) **Sand** (except naturally bonded moulding; ground or pulverized sand), in open-top equipment, carloads, (See Note 3), but orders will not be accepted for closed and open-top cars of less marked capacity than 60,000 lb. and 80,000 lb., respectively, from Bay City, Wis., Maiden Rock, Wis., Hager, Wis., and Red Wing, Minn., to Muncie, Ind. Rates in cents per net ton: Proposed, (A), 310; (B), 341; (C), 310.

E-41-97. **Silica sand,** carload, (See Note 2), from Oetters, Mo., to E. St. Louis, Ill., and Kansas City, Mo.-Kan. Proposed, to E. St. Louis (46 miles), 97c per ton. Terminal R. R. Assn. charge to be absorbed, also not to exceed 20c per ton connecting line switching charge. To Kansas City (260 miles), $1.45 per ton.

E-41-105. **Chatt sand,** carloads. Minimum weight 100,000 lb. From Cave Springs, Mo., Chitwood, Mo., Galena, Kan., and Joplin, Mo., to Heltonville, Ind. Rates: Proposed—$3.53 per ton of 2000 lb., plus emergency charge.

Sup. 1 to E-195-1. **Dolomite,** in open top cars, C. L. From Manitou, Colo., to Okmulgee, Okla. This subject has now been canceled from the docket.

8163. **Crushed stone and slag,** C. L., (See Note 3), but not less than 40,000 lb.

From	To	Prop.
E. St. Louis, Ill.	Boyle, Ill.	88
*Krause, Ill.	Clarke, Ill.	88
*Stolle, Ill.	King, Ill.	88
†Valmeyer, Ill.	Titus, Ill.	88
	Bakersfield, Ill.	101
	East Hardin, Ill.	101
	Reddish, Ill.	101

*E. St. Louis rates plus 10c per ton.
†E. St. Louis rates plus 15c per ton.

Illinois

8132. **Stone, crushed,** (See Note 3), but not less than 60,000 lb., from Joliet, Ill., to West Lake Forest, Ill. Proposed—85c ton.

8135. **Stone, crushed,** and **crushed slag,** carload, (See Note 3), but in no case less than 40,000 lb., from Joliet, Ill. (district) to B. & O. R. R. stations in Illinois; viz., Bluff Springs, Cass, Virginia, Burlingame, Philadelphia, Gurney (Cass Co.), Richland, Bradfordton, Coal Shaft and Pleasant Plains. Proposed, $1.01 net ton.

8138. **Sand and gravel,** viz., all kinds, except blast, engine, foundry, glass, moulding and silica, (See Note 3), from Lincoln, Ill., to Priscilla, McNabb and Granville, Ill. (N. Y. C. R. R.) Proposed, $1.08 per net ton.

Cement Products

Flat Roofs, Basements and Concrete Products

How the Concrete Products Producer Can Meet Two Important Structural Trends

TWO CURRENT trends of architecture concern the market for concrete masonry units, and therefore concrete products manufacturers: A trend to flat roof decks, and a trend to eliminate basements. There is no indication that any relation exists between these trends. There is no reason why they should be related. So consider them separate.

What has caused the trend to flat decks? For many years there were efforts to sell flat roof houses. They met with failure. Suddenly everyone starts building them.

The reason lies in the fact that early attempts failed to provide a satisfactory architecture. Designs with flat decks still needed gable roofs to look right. And no attempt was made to utilize the extra space created. The desire to "trim" a house with fancy but useless decoration was still current. As simplicity, balance and good proportion became accepted, the flat roof proved best suited to the style. It simplified construction, and with plain walls in good proportion the gable roof was not missed.

Advantages

What does the flat roof do for the home owner? First, it simplifies his roof problem. Any inexpensive kind of roofing can be used without detracting from the appearance of the house. Second, it can provide a real outdoor living room with privacy not possible in porches. Third, the flat deck costs less to build than the gable roof.

Joists for Deck

How does the concrete products manufacturer benefit? A concrete joist deck is the best possible construction for flat roofs. With the advantages offered the home owner by this type of roof, including low cost, the products man is in a stronger sales position. He has something to offer the builder of extreme interest.

A concrete first floor has strong sales appeal in its fireproofness; its freedom from vermin attack. The flat deck has advantages which strengthen interest in concrete joists, and double the market. Here is important opportunity for the alert manufacturer who would develop the concrete joist market.

The Basement Problem

Now let's look at the basement. What is causing the trend away from the basement? Two reasons may be given: the cost, and the trend away from coal as fuel, with its requirement for storage space. With oil or gas heat, less dirt is introduced in the house for heating it; a furnace room off the kitchen is no longer objectionable.

How does this trend affect the concrete products manufacturer? For years, basement walls have been bread and butter for products plants. There is still a large potential business to be had. If the trend to eliminate basements continues it will mean a serious loss to many concrete products manufacturers.

What influences may counteract this trend? One is the move to make recreation rooms in basements. In olden days basements were dismal, dirty storerooms. People kept out of them as much as possible. Now many people have recreation rooms in their basements—find them the most enjoyable part of the home. And, as people have more time to spend in leisure, such rooms should multiply. Particularly in colder climates are such rooms popular. For there can be no cozier place in the house on a chilly night than in a basement recreation room.

Popularize Basements

So products manufacturers should see some silver in the clouds and push basement recreation rooms—for the business they can get in building them, and to stimulate their growing popularity and forestall the trend to eliminate them.

Lady Cement Chemist

Washington-Idaho Lime Products Co., Orofino, Ida., newest portland cement plant, has acquired as chemist Miss Martha Simons, daughter of E. J. Simons, president of the company. Is she the first lady chemist in the industry?

Flat roofs and sun decks add to the attractiveness of this new slag block home in Long Beach, Ind.

Ready-Mixed Concrete Patents

THE POWELL CO., Philadelphia, Penn., through Charles Warner, Jr., secretary-treasurer, advises ROCK PRODUCTS as follows:

"The business status of the Powell process patents, covering the basic process involved in manufacturing and transporting central-mixed concrete in closed agitator trucks, has been satisfactorily settled by the negotiation of contracts between the Powell Co. and the four principal manufacturers of concrete mixing bodies. These companies are now prepared to sell all equipment of this class, with complete Powell patent coverage for the life of such bodies.

"In its desire to remove the uncertainty that has existed for the past two or three years respecting this basic protection to users of the central-mix process, the Powell Co. decided to complete these arrangements for patent license on all their bodies on such a basis that these truck body companies could extend full coverage on all equipment sold to the concrete manufacturing industry at their standard list prices. Those users of the central-mix, plus agitating delivery process, who have well developed their technique in quality control and economic practices, realize that under most conditions this method provides the lowest total cost of operation and the most uniform and reliable quality of concrete.

"The Powell Co. had hoped, in its original plans of two or three years ago, to interest the producers of central-mix concrete in an association of licensees to promote this process for general use throughout North America, based on these two sound factors, quality of production and economy of operation. These plans did not materialize but this in no way changes the fundamental advantages secured by the use of this process for those who have well developed it in practice. The Powell Co., however, desired to dispose of the patent uncertainty and to make its contribution to the advancement of the best engineering and business practices. It therefore concluded to work out its plans by licensing the Blaw-Knox Co., Chain Belt Co., Jaeger Machine Co., and Ransome Concrete Machinery Co. for full coverage for the life of each mixer body sold by these companies during the life of the agreement.

"We are glad that the uncertainty has now been cleared up so that all users of the equipment of these companies, covering all agitator bodies sold prior to this time, as well as new bodies to be sold during the continuance of this license agreement, are fully protected under this basic patent. Since these body manufacturing companies can supply a broad range of high-class, standard equipment for this service to concrete manufacturers we believe that no impediment now stands in the way of the extensive and safe use of the central-mix process."

Portland Cement Pavement Yardage

AWARDS of concrete pavement for August, 1935, were announced by the Portland Cement Association as follows:

	Sq. yd. awarded during August, 1935	Total sq yd. for year to date, Aug. 31, 1935
Roads	2,394,870	14,237,829
Streets	631,376	6,240,752
Alleys	25,263	103,205
	3,051,509	20,581,786

Sand-Lime Brick Production and Shipments in August, 1935

THE FOLLOWING DATA are compiled from reports received direct from prdoucers of sand-lime brick located in various parts of the United States and Canada. The accompanying statistics may be regarded as representative of the industry.

Eleven active sand-lime brick plants reported for the month of August, this number being the same as that reporting for the month of July, statistics for which were published in September.

Average Prices for August

Shipping Point	Plant price	Delivered
Dayton, Ohio	$....	$14.00
Grand Rapids, Mich.	10.00	....
Mishawaka, Ind.	9.25	....
Syracuse, N. Y.	14.00	16.00–20.00
Saginaw, Mich.	11.00	....
Sioux Falls, S. D.	11.50	....
Madison, Wis.	11.50	13.00
Toronto, Ont., Can.	12.00	13.50

Statistics for July and August

	July†	August*
Production	2,077,115	1,973,665
Shipments (rail)	213,450	144,200
Shipments (truck)	1,900,698	1,873,453
Stocks on hand	1,876,806	1,920,609
Unfilled orders	1,150,000	1,012,000

†Eleven plants reporting; incomplete, four not reporting unfilled orders.

*Eleven plants reporting; incomplete, two not reporting unfilled orders.

Sand-Lime Brick

Wisconsin Brick Co., Madison, Wis., recently sold 170,000 sand-lime brick for use in a WERA project.

◆ ◆ ◆

Sioux Falls Pressed Brick Co., Sioux Falls, S. D., has received an order for brick for "The House of Gurney," a new radio station near Yankton and Missionhill, S. D., which is being built at a high point for better broadcasting.

◆ ◆ ◆

Bela L. Foresman, receiver of **Boice Bros.,** Pontiac, Mich., recently filled orders for Fisher Body plant additions in Flint, Mich.; WWJ Radio Station in the Detroit area; county buildings in Port Huron, Mich.; and school buildings in Jackson, Mich. The firm is now filling an order for Oakland Housing Corp., for a government subsistence-housing project at Green Lake, Mich.; sand-lime brick have been specified for the first 150 units, each of which requires about 2000 brick.

Develops Volcanic Ash Deposit

Voltuff Products Co., New Plymouth, Ida., has been incorporated to develop a deposit of volcanic tufa or pumicite. Both block and pulverized material will be produced.

Seeks Permit to Dredge Gravel

Calvin Taylor, Handsboro, Miss., has filed an application with the Mobile engineer office of the War Department for permission to dredge sand and gravel for commercial purposes from Bayou Bernard, near Handsboro.

Cement Production Dips

THE portland cement industry in August, 1935, produced 7,235,000 bbl., shipped 8,105,000 from the mills, and had in stock at the end of the month 22,418,000. Production in August, 1935, showed a decrease of 7.7% and shipments a decrease of 1.7%, as compared with August, 1934. Stocks at mills were 4.6% higher than a year ago. The statistics here given are compiled from reports for August, received by the Bureau of Mines, from all manufacturing plants except one. In the following statement of relation of production to capacity the total output of finished cement is compared with the estimated capacity of 162 plants at the close of August, 1935, and of 163 plants at the close of August, 1934.

RATIO (PER CENT) OF PRODUCTION TO CAPACITY

	August, 1934	July, 1935	June, 1935	May, 1935
The month...	34.5	31.8	35.3	39.6	36.1
The 12 months ended.....	26.8	27.4	27.7	27.7	27.7

Wins Right to Continue

Granite Materials Co., Los Angeles, Calif., was granted the right to continue operation by a 9 to 4 vote of the city council, September 3. The plant is on Tujunga avenue between San Fernando road and Roscoe boulevard. A number of property owners protested, declaring the rock crushing plant jeopardizes their homes and interferes with residential development in the district. The company pointed out that the plant consolidates its operations and eliminates a three-mile haul.

One Cent Per Yard—Gravel Royalty

AT Salem, Ore., a lease of a gravel pit to the county by private parties was made recently for $100 per year plus 1c per cu. yd. for all material taken out.

Calcium Chloride Stabilized Gravel Roads

THOROUGHLY compacted stabilized gravel roads attain a density equal to that of portland cement concretes, according to investigations by Fred Burggraf, materials engineer of the Calcium Chloride Association.

These remarkable densities are exhibited by soil roads constructed by the stabilization method developed as a new type low cost surface through soil studies of the U. S. Bureau of Public Roads.

In test samples, weights of 145 to 154 lb. per cu. ft. were shown by stabilized gravel taken from roads which had been in service a year or more. This is approximately the same as the weight of portland cement concrete, which averages about 150 lb. per cu. ft. Gravel, clay and calcium chloride, mixed according to standard specifications, were used in the construction of the roads tested.

New Machinery and Equipment

Left—Truck with movable floor discharging sand. Right—Truck of 5 cu. yd. capacity fitted with load spreader

Truck Load Spreader

EASTON CAR AND CONSTRUCTION CO., Easton, Penn., has been licensed to manufacture a new type of truck body having a movable floor, known in Great Britain by the trade name "Loryflor."

This device serves both to load and unload any truck body as may be desired at any speed. Bodies with these floors have been used in England for several years and for all kinds of material, boxes, brick, crates, garbage, refuse, sand, gravel, clay, mortar, crushed stone, amesite, tar macadam, etc.

The floor is equally applicable to side as well as rear discharge of the load. For spreading stone or tar macadam the load can be discharged and laid to any thickness desired, or in piles or all in one place.

Since standard bodies attached to the chassis are used, and the body is never tilted, there is no unequal strain on the chassis and no jerking with the elevated body to remove the last of the load.

Variable Speed Transmission

LINK-BELT CO., Chicago, Ill., announces that in order to meet the growing demand for still greater range and flexibility of application, certain features of design have recently been incorporated in its P.I.V. gear variable speed transmission, which will permit the entire line to be furnished in the following combinations and sizes:

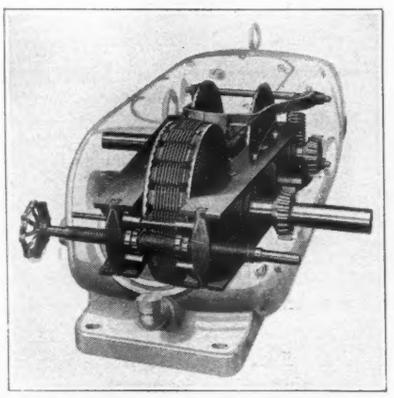
(1) Motorized (when desired), with motor forming an integral part of the unit.

(2) With or without speed reduction gearing.

(3) With horizontal or vertical box.

(4) And in five sizes up to 15-hp. capacity.

Previously, P.I.V.'s were available in sizes up to but 10-hp., with horizontal box only, and without reduction gear sets or the integral motor feature. The motorized construction is said to make a very compact drive, eliminating the need of a separate motor base plate.



Motorized variable speed transmission

Cement Clinker Cooler Kiln Burner

TRAYLOR ENGINEERING AND MANUFACTURING CO., Allentown, Penn., announces the Traylor-Cheesman patented rotary clinker cooler and the Traylor-Cheesman patented burner, which are designed to be used in combination to give high efficiency in clinker cooling and fuel consumption.

The cooler (Fig. 1) is of the three-pass type, claimed to cool clinker to within 100 deg. of atmospheric temperature, with utilization of the heat recovered for combustion. The air admitted to the cooler travels counterflow with the clinker, and in intimate contact with heat-transfer elements, utilizing two basic elements of heat transfer—high velocity of gases and ample heat radiating surfaces.

Here are some of the advantages claimed: Cooler completely enclosed within the shell and is accessible; due to distribution of loads, minimum power requirement; less power than other types of cooler because they require larger volumes of air at higher resistances; only one fan required for cooler and burner; all the air required for cooling is used in the kiln for combustion; no waste of heat units or of power.

Operation is described as follows: "The clinker is spouted into a brick-lined cylindrical chamber provided with lifters to shower the material. It then enters three of six flues formed in the annular space between the outer shell and a center tube, at the lower end of the cooler.

"The clinker moves through these flues to the ends, at the discharge end of the cooler, where it is spouted into the center tube, which is provided with spiral lifters to cause the clinker to move towards the feed end. At the forward end of this tube the material is spouted into the other three, or 'cold' flues, in which it again moves toward the discharge end. At the lower end of these flues the clinker is discharged into an annular trough built with lifter buckets which elevate it into a fixed discharge spout. The six flues are fitted with lifters, and chains to hasten transfer of the clinker heat to the air.

"The air moves through the cooler countercurrent to the clinker, in order to maintain a constant temperature differential, thereby assuring a uniformity in the physical condition of the clinker. Thus the air is gradually heated and attains its highest temperature when passing through the brick-lined receiving chamber, whence it is drawn into a cyclone and thence blown into the kiln burner. The brick-lined chamber is about half the length of the cooler, but due to the three-pass arrangement in the lower half of the shell the air travels about twice the length of the cooler. Also, the velocity of the air through the flues, where the temperatures are comparatively low, is very high, resulting in the most rapid and efficient heat exchange.

"The interiors of all of the flues are ac-

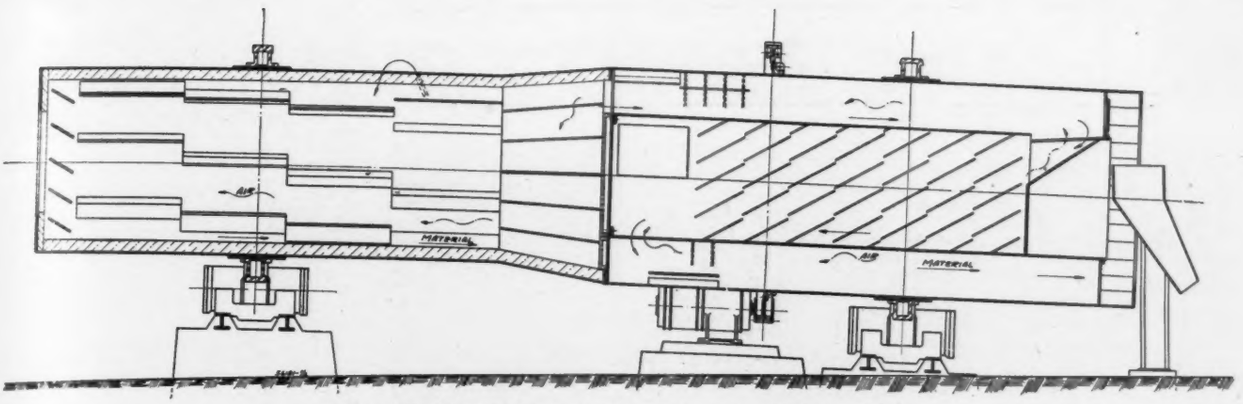


Fig. 1—Sectional view of three-pass type clinker cooler

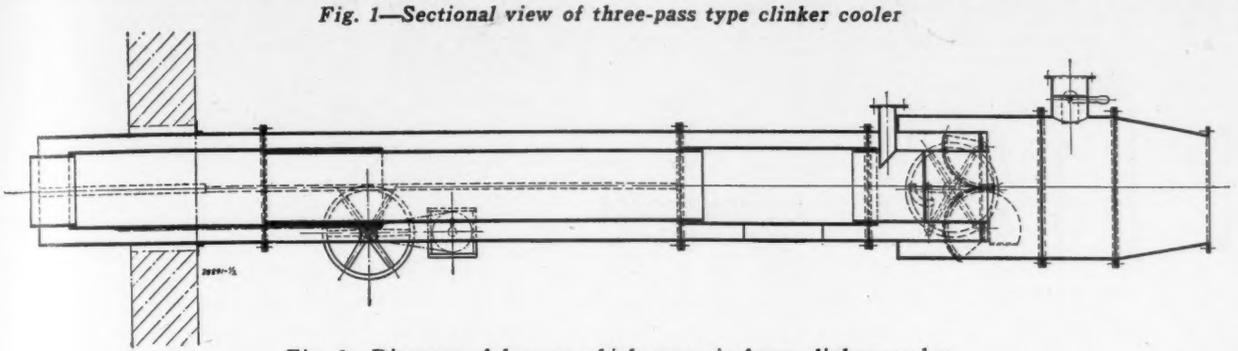


Fig. 2—Diagram of burner which uses air from clinker cooler

cessible from the discharge end of the cooler, the three 'cold' flues being open while the three 'hot' flues are provided with manholes. A sectional head forms a partition between the brick-lined receiving chamber and the three 'cold' flues and the center tube.

"Ports and spouts are provided to direct the clinker into the center tube and other ports are located at the upper end of this tube to discharge the clinker into the three 'cold' flues. Deflectors fitted into the upper ends of the 'cold' flues direct the clinker to the discharge end of the cooler. The center tube and the partitions that form the six cooling flues in the annular space surrounding the center tube, are of such design and assembled in such manner as to permit free expansion and contracts, due to changes in temperature, without damage or distortion."

Burner

The Traylor-Cheesman patented burner is adaptable for pulverized coal, gas or fuel oil. In this device, it is claimed, all of the heated air from the clinker cooler supplies from 70% to 90% of the total quantity of air required for complete combustion of the kiln fuel. This hot air is drawn from the connection between the kiln hood and the cooler. It passes into an adjustable cyclone where excess clinker dust is taken out. A fan draws the cleaned gas from the cyclone and blows it into the burner. Further, fuel may be introduced with either the primary or secondary air, depending on furnace conditions. (See Fig. 2.)

Fig. 3—Burner used in pulverized coal installation

The burner is provided with adjusting devices in order that the primary and secondary air blasts may be varied. The tip of the inside burner tube is also adjustable, making it possible to obtain any desired flame and giving the operator complete control of combustion. The operator has at all times a clear view of the interior of the kiln, enabling him to adjust the flame.

Operation is described as follows: "The heated air from the cooler may have a temperature as high as 900 deg. F., or more, and all of this heat passes through the burner, thus attaining the highest possible economy. The flame is luminous, affording rapid transfer of the heat to the material being burned.

"The burner is of double-tube design. The inside tube carries the primary air, while the annular space between the inner and outer tubes is for the secondary air. Each of these conduits is provided with a separate regulating valve so that the quantity of air passing through each can be minutely controlled. The levers for these valves are fitted with quadrants so as to enable locking them in place.

"The inner burner tube is fitted with a longitudinally adjustable sleeve at the flame end. This is adjusted from the outside by means of a lever, and the shape of the flame is regulated by changing the position of the sleeve. The fuel is introduced through the center tube.

"The tube is so constructed that it may readily be removed and permit of the withdrawal of the fire hood to obtain access to the interior of the kiln without disturbing the regulating valves or the fan.

"Fig. 3 shows a recent installation of a burner using pulverized coal."

Installations made in cement plants within the past five years have demonstrated the following advantages, according to the manufacturers:

(1) Reduction in fuel consumption per barrel of clinker of from 100,000 to 400,000 B.t.u.

(2) Increase in kiln capacities of from 10% to 40%.

(3) Easier grinding clinker; from 10% to 20% more clinker ground to the same degree of fineness with the same energy input.

(4) The life of the kiln lining in the burning zone markedly increased, due to the positive control by the kiln operator of the flame condition in his kiln and to the elimination of any harsh or extreme temperature conditions; visibility within the kiln through the burning zone remarkably clear, so that the operator can see the condition at all times.

(5) The quality of the cement, both as to color and uniformity, improved.

(6) Clinker handled directly from the coolers into the grinding mills, eliminating handling charges and dust losses common with clinker storages.

THE INDUSTRY

New Incorporations

Middle Creek Sand and Limestone Co., Chattanooga, Tenn.; 2,000 shares, no par value.

The Southern Mica Co. of Wilmington, Del., has been incorporated in Tennessee with Johnson City as its Tennessee office; 1,000 shares.

Morrow County Sand & Gravel Co., Fulton, Ohio; 250 shares, no par. Incorporators are Edwin S. Griffiths, Clark R. Davis and Herman V. Irey.

Oklahoma Lime Products, Inc., Tulsa, Okla.; capital stock $2000. Incorporators are J. Harold Adkison, Katherine D. Adkison and J. M. Adkison.

Oklahoma Vault & Tomb Co., Oklahoma City, Okla.; concrete products; capital $10,000. Incorporators are E. A. Frazee and Howard Wilson.

West Farmington Washed Gravel Co., 7332 W. 7-Mile Road, Detroit, Mich.; to deal in rock, stone, and gravel, $20,000. Incorporated by Leo Ioppolo.

Red River Sand & Gravel Co., Oklahoma City, Okla.; $25,000. Incorporators are Moore C. Hess, 44 E. Portland St.; L. B. Selman and A. E. Perry.

Toledo Plaster and Supply Co., Toledo, Ohio; 400 shares no par, $40,000 preferred. Incorporators are H. R. Bloch, E. A. Pilsecker and L. M. Eichner.

Union Concrete Pipe Co., Inc., Parker, Wash.; to deal in cement and cement products; $50,000. Incorporators are Stella Ban, Frank H. and Glessner C. Souther.

Sterling Mica Mines, Inc., Boston, Mass.; $25,000—250 shares at $100 each. Incorporators are Earle B. Boss, Billerica; Ralph L. Loomis, Bedford, and Dorothy A. Mack, Boston.

Superior Stone Co., 165 W. Wacker Dr., Chicago, Ill.; to deal in sand, gravel, stone, rock, clays; 25,000 shares no par value common. Incorporators are W. P. Hodgkins, P. H. Kelly and Marshall G. Sampsell.

Voltuff Products Co., New Plymouth, Idaho; to engage in quarrying, cutting and manufacturing building materials made from extensive deposits of volcanic tuff or pumicite, located in Payette county.

Personals

W. P. McGeorge, head of the Pine Bluff Sand and Gravel Co., Pine Bluff, Ark., was elected president of the local Zebra Booster club early in September.

Roy A. Schweiger, Kansas City, Mo., has become purchasing agent for the Trinity Portland Cement Co. of Dallas, Texas. Mr. Schweiger was formerly associated with the Consolidated Cement Corp. of Fredonia, Kan., and Chicago, Ill.

Harry Neal Baum has been appointed advertising manager of Fairbanks-Morse & Co., Chicago, Ill., succeeding W. T. Watt, who has joined the publication *Industrial Power*. Mr. Baum formerly was advertising manager of the Celite Products Co., now a subsidiary of Johns-Manville.

Obituaries

Charles S. McNeal, Hinsdale, Ill., former president of the Garden City Sand Co., Chicago, Ill., died September 1 of a heart attack. He was 62 years old. Surviving are his widow and three daughters.

John Walter Cowan, 56, of Cumberland Portland Cement Co., died at Cowan, Tenn., August 20, after a year's illness.

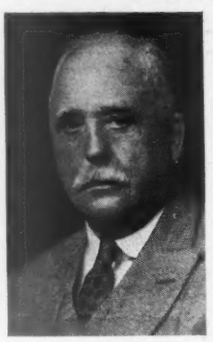
Frank A. Cannon, Milwaukee, Wis., widely-known good roads advocate, died August 17 following an operation. He was 62. Mr. Cannon was a pioneer in the interest of the Wisconsin highway system. For about 10 years he was secretary of the Good Roads Association, living at Madison. At his death he was executive secretary of the Wisconsin Associated Contractors' Association. Crisis of his ailment was brought about, physicians said, in overwork in his championship before the legislature of the recently-enacted state recovery act.

Robert P. Peebles, chief engineer of Castalia Portland Cement Co., Pittsburgh, Penn., died suddenly September 4. He had served with the company for 17 years.

William L. Sporborg, a director of the General Crushed Stone Co., Easton, Penn., died September 1 at his home in Syracuse, N. Y., following a heart attack the previous week. Mr. Sporborg entered the quarry business 30 years ago, when he directed development of the Rock Cut Stone Co. quarry at Jamesville. In 1928 this company merged with the Easton firm. Mr. Sporborg was active in Syracuse civic affairs.

W. L. Sporborg

Harry S. Angle, 61, of Chattanooga, Tenn., retired traffic manager of the Pennsylvania-Dixie Cement Co., died August 21 of injuries received in an automobile accident.



R. C. Brown

Rufus C. Brown, president of the Cook & Brown Lime Co., Oshkosh, Wis., died September 10 of a heart attack. He was 87 years old. Known familiarly as "Choate" Brown, he became a part of Cook, Brown & Co. in 1874; it was not until 1887 that the name was changed to Cook & Brown Lime Co. Mr. Brown, a resident of Oshkosh for about 70 years, was prominent in its civic, financial and social affairs. He was recognized as an authority on retail handling of coal, lime and building materials, and he held positions in many companies, including Western Lime and Cement Co., Milwaukee, and Wisconsin Lime and Cement Co., Chicago. Years ago he was secretary of the Union Lime Co. of Milwaukee.

Arthur F. Williams, president of Williams Patent Crusher and Pulverizer Co., St. Louis, Mo., died August 21 at the age of 55, following an illness of 18 months. Active for many years in the company founded by his father, Mr. Williams aided in the development of crushing and grinding equipment and had served as president of the company since the death of his father 12 years ago. Surviving are his widow, three sons and a daughter.

A. F. Williams

B. W. Traylor, district manager of the southern territory of Traylor Engineering & Mfg. Co., Allentown, Penn., died August 14.

W. W. Hamilton

William W. Hamilton, Easton, Penn., safety director of Alpha Portland Cement Co. since 1929, died at Cincinnati, Ohio, August 27, following an operation. A leading figure in the safety work of the cement industry, he was an active member of the Committee on Accident Prevention and Insurance of the Portland Cement Association for many years. Before his appointment to head the safety work of the Alpha company, he had been chief engineer and safety director of the Alpha plant at Ironton, Ohio, and had distinguished himself by building up the safety work of that plant to nation-wide recognition at a time when extensive repair operations were under way.

William Elsworth Craiglow, 62, partner of Ralph E. Cowan in the United Cement Products Co., Wichita, Kan., died September 10 after an illness of six months. He entered the construction field at the age of 18 and worked for a number of years as superintendent of construction with telephone companies in Ohio, Illinois, and Kansas. He started to develop oil tracts in 1912, interrupting this work at the time of the war to buy and sell mules for the government in California. Mr. Craiglow reorganized the Wichita Duntile Co. into the United Cement Products Co.

Arthur Whitcraft, vice-president and general manager of the Utilities Foundry Corp., Emporium, Penn., died suddenly August 26 of heart attack. Connected with the foundry and steel industry since 1913, he was with the American Manganese Steel Co. for a number of years, later going to the Hadfield Penfield Steel Co. at Bucyrus, Ohio. In recent years he had been associated with foundries making water and gas specialties.

Crushed Stone

Montpelier, Iowa: Work at the Schroeder quarry was started again late in August.

Martins Ferry, Ohio: A relief-operated stone quarry in Somerset township was opened recently.

Fairfield, Iowa: Jefferson county leased a new 1-acre quarry 2½ miles south of Libertyville on the O. J. Claridge farm early in September for $100.

Brownwood, Texas, has undertaken operation of a rock crusher, total cost of which will be $15,259 60, WPA paying $5,448 and the city $9,811.60.

Northfield, Minn.: Rice county commissioners have made plans for supplying road material from Faribault, Northfield and Merstrand under a WPA set-up.

Washington, Iowa: Washington county board of supervisors has submitted three projects for approval to WPA, the major one involving operation of a quarry.

Oswego, Kan.: The state rock crusher which has operated on the R. I. Greene farm east of Oswego producing rock for Highway 96 has been moved to the vicinity of Iola.

Biggsville, Ill.: The stone quarry on the old Hamburg property north of Biggsville, which has not operated for years, has been opened by the present tenant, James M. Kilgore.

York, S. C.: With plans for building a couple of hundred miles of county road in the next year, the York county board has decided to buy a rock crusher, not to exceed $2000 in cost.

Bethany, Mo.: Sugar Creek and Fox Creek townships contemplate buying a rock crusher to use in WPA road building and have been making investigations regarding such equipment at Centerville, Iowa.

Plattsmouth, Neb.: The Jasper Stone Co., which has operated around Weeping Water getting out stone for use in Missouri river development work, has opened a second quarry on the land of Warren T. Richards of Wabash.

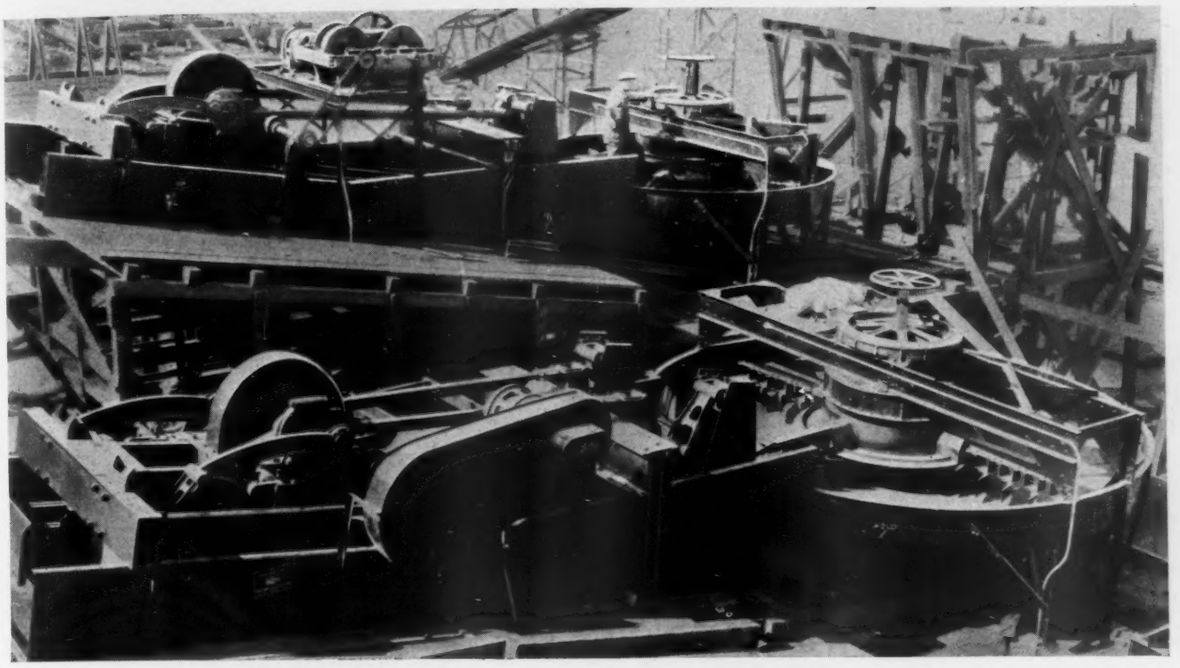
Ottumwa, Iowa: Regular production of rock has started again at the Wapello county rock quarry on the south Des Moines river bank after the flooding this summer. Two crushers are being used, with 227 men.

Chickasha, Okla.: State WPA Administrator W. S. Key has approved projects in Grady and Caddo counties. About 109 men are to produce 3000 cu. yd. of stone from a quarry west of Chickasha, the cost of operation to be $57,989.

Corning, Iowa: The rock quarry on the Vernon land southwest of Corning has been operating under the supervision of the Wahl Construction Co., and a number of contracts have been let for county and state highway work. The Mercer Center road is being constructed from Adams county gravel pit. New machinery may be added when the work is speeded up.

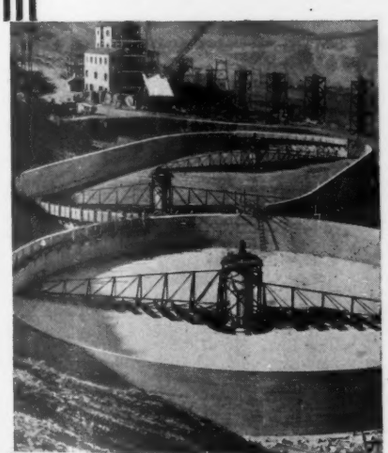
Wichita, Kan.: Upon condition that Sedgwick county commissioners will not permit beer, liquor or gambling on his premises, John M. Davis, Rose Hill, has leased his granite type stone quarry to the county at 8½c a cu. yd. Another provision of the lease is that no one except Davis may erect a cafe or any kind of a concession near the place. The county plans a large roads program under WPA.

At GRAND COULEE DAM . .



Two of three Dorr Bowl Classifiers preparing sand at Grand Coulee.

• Dorr Classifiers prepare high-specification sand



These three Dorr Clarifiers recover wash water so that it may be reused in the aggregates plant in the background.

DORRCO

Ten to twelve million cubic yards of top grade concrete are going to be poured before Grand Coulee is finished, the world's largest concrete dam. Again, high sand specifications, just as at Boulder Dam and T.V.A. And again, as at Boulder Dam and T.V.A., no run-off-pit sand preparation apparatus, no gambling on the quality of the all-important concrete sand.

Significantly Dorr Classifiers have been selected by all three — first Boulder Dam, then T.V.A. and now Grand Coulee. More costly, yes. But with a strictly drawn specification to meet, nothing might cost so much as equipment that cost too little.

Screen undersize is dewatered and sent to a battery of three Dorr Bowl Classifiers. The Dorr Classifiers fraction the sand into three sizes — 3/16" to 20 mesh, 20 to 48 mesh and 48 to 100 mesh. These three fractions are continuously blended to a fineness modulus of 2½ to 3. Process water is recovered in three Dorr Clarifiers and returned to the plant for reuse. Rated capacity is 1000 tons per hour.

Stricter sand specifications are here to stay. A note to our nearest office will bring you constructive suggestions on how to meet the strictest sand specifications ever written.

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SOUTH AFRICA: Edward L. Bateman Pty. Ltd., Johannesburg
GERMANY: Dorr Gesellschaft, m. b. H. Berlin
JAPAN: Andrews & George Co. Inc., Tokio

Paris, Mo. Joé Harrell of Holliday, president of the Monroe county planning board, has requested the county court to buy or lease a rock crusher with money to be paid in from federal sources. The county court temporarily deferred the matter.

Macomb, Ill.: Since the close of the rock quarry on the George Shifley farm west of Macomb, the Jansen Sheaffer Construction Co., constructing a new sewage disposal plant, has located a new quarry on the George McClure farm northwest of Colchester.

Atlantic, Iowa: The Cass county board has signed a 5-year lease for obtaining rock for county roads from the Wilbur Pierce quarry, 2 miles west of Lewis, at 10c a cu. yd. Application has been made for approval of WPA projects on country trunk roads C, L, K, G and No. 2.

Columbia, Mo.: The street committee of the city council is planning to lease a rock crusher for the production of materials cheaply and hopes to obtain a WPA allotment to pay labor for improving city streets. WPA projects are also planned for improvement of the municipal airport.

El Paso, Tex.: El Paso county commissioners have agreed to furnish all supervision on WPA projects undertaken in the county, aggregating $243,000 in road improvements. About 30,000 tons of rock will be needed in the projects, and the county considers either renting or buying a rock crusher and producing material at 40c a cu. yd.

Bloomfield, Iowa: Eight works progress projects are planned by Davis county to absorb all unemployment. Establishment of a rock quarry, northwest of Lebanon, will be the major project, calling for the crushing of 40,000 cu. yd. of rock to surface 42 miles of road. The Mark-Monterey road and county trunk roads M and H are to be improved.

Fond du Lac, Wis.: John C. Kiley, Fond du Lac county work secretary, has applied to WPA for $11,002 to be used in quarrying and hauling stone for the construction of a school building in the Village of North Fond du Lac. The project would provide 750 cu. yd. of stone secured from the Herman Nast quarry in Eden at 50c a cu. yd., the application says.

Waverly, Iowa: A $28,000 set-up for road-surfacing has been presented to WPA by the Bremer county board of supervisors. The plan involves obtaining crushed rock from the new county quarry at Frederika, most of it to be used in the northern half of the county. This quarry is now being operated by county labor and is producing 80 cu. yd. of limestone a day.

Trenton, Mo.: The Grundy county court announced early in September that it would co-operate in the movement to secure rock crushers for work in the county by contributing $100 to the cost of the purchase of a crusher by any township board. The county planning board hopes thus to be able to produce material for graveling local roads, using WPA funds to pay labor costs.

Vinita, Okla.: C. A. Moore, Joplin (Mo.) engineer, has completed preliminary surveys on six WPA projects recommended for Vinita and has drawn up plans to set up a rock crushing plant on the Ed Bond property 5 miles east of town to furnish material for the street graveling program. The crusher is expected to save the city money on crushed rock, the only expense being the 5-mile truck haul.

Sand and Gravel

Winchester Gravel and Stone Co., Winchester, Ind., has filed papers for dissolution.

William Pronger, Worth, Ill., suffered loss of his frame gravel plant by fire of unknown cause August 3. The building, valued at $800, and the contents, valued at $7000, were completely lost.

Grand Rapids, Mich.: A gravel pit on the farm of Mathias Pline north of Portland was recently opened to secure 150 cu. yd. of gravel for 4½ miles of asphaltic oil highway from Westphalia north to M21.

Muskegon, Mich.: Muskegon county road commission recently leased a gravel pit near Maple Island from William Drake for ten years at a cost of $1250. At least 5000 cu. yd., it is estimated, will be used this year for county roads.

Ottumwa, Iowa: The Wapello county gravel quarry was reopened early in August. A second rock crusher was recently rented and has been put in operation. Production had been suspended at the quarry when river flood waters inundated the area several weeks ago.

Lincoln, Ill.: The old Logan county gravel pit north of Mt. Pulaski is being reopened and enlarged by George Hoffmann Construction Co. with a view to procuring gravel for road work.

Audubon, Iowa: The new county gravel pits were opened in Audubon county the latter part of July—one on the John Rentfle farm, and the other on the Jesse Bruner farm. The county has contracted with the owners to purchase the gravel for 10c a cu. yd.

South Bend, Ind.: Discovery of a large gravel deposit at Twyckenham Dr. and Corby Blvd. on city property is expected to speed work and reduce, by several thousand dollars, South Bend's share of expenses on its work relief project to repair city streets and alleys.

Springfield, Neb.: Sarpy county commissioners are considering securing a sand pump to load material from a gravel bed on a Platte River island south of town, where tests show gravel quality to be first class. The old Krebs quarry has been abandoned as the cost of stripping grew prohibitive when the material shelved back under clay banks.

Ripon, Wis.: As part of a dust prevention program, Fond du Lac county has opened a gravel pit west of Thomas St. on the south edge of the city and is producing gravel to augment loose materials on Trunks KK and E, which are to be treated with a dust layer turnover mat. Usual summer repair work of filling in holes has been carried on for Ripon streets.

Cement

Alpha Portland Cement Co. resumed operation of its Ironton, Ohio, plant September 2.

Lone Star Cement Corp., Kansas, will operate its Bonner Springs plant throughout September, according to a statement recently made by Supt. John O'Callaghan.

Colorado Portland Cement Co. reopened its Boettcher, Colo., plant September 16 for a run expected to last about three months.

Monarch Cement Co., Humboldt, Kan., suspended operation of its plant August 3, planning to ship from stock for a few weeks and then resume operation through the fall and winter months.

The Ash Grove Lime and Portland Cement Co. plant at Chanute, Kan., suspended operation at the end of August. Shipments will continue from stock. A small force of men was retained to make repairs.

Bessemer Limestone and Cement Co., Bessemer, Penn., was linked with the Pennsylvania Railroad system when the Interstate Commerce Commission, on August 21, authorized the railroad to operate over rail leased by the Pittsburgh and Lake Erie Railroad Co. and a short track owned by the cement company.

Pennsylvania-Dixie Cement Corp. held a conference of district salesmen from Virginia, West Virginia, North Carolina, Kentucky, Alabama, Tennessee, Mississippi, Arkansas and Louisiana in Chattanooga, Tenn., July 25 to 27. From New York headquarters came Walter S. Wing, general sales manager; Frank J. Selinger, assistant general sales manager; H. C. Shields, service engineer; and E. W. Combs.

Miscellaneous

E. J. Lavino and Co., Lavino Refractories Co., Lavino Furnace Co., Lavino Shipping Co. and Rogers Brown-Lavino Co., moved their general offices on September 1 to 1528 Walnut St., Philadelphia, Penn.

Manufacturers

Fuller Co., Catasauqua, Penn., has opened a district office at 564 Market St., San Francisco, Calif., to handle Pacific Coast sales and servicing. The engineer in charge is Jose M. Alonso, formerly manager of the Chicago district office.

The Brown Instrument Co., Philadelphia, Penn., on its 75th anniversary announced a new line of air operated controllers for temperature, flow, pressure and liquid level, the most outstanding new instrument being the highly adaptable "Air-o-Line." Catalog 8900 describes all types of Brown indicators and recorders.

Caterpillar Tractor Co., Peoria, Ill., announces that Paul Weeks, for four years manager of its Washington office, succeeds Walter H. Gardner as manager of the special sales division, as Mr. Gardner leaves the company October 1 to become general sales manager of Keystone Steel & Wire Co. Assisting Mr. Weeks are C. L. McMullen, in charge of engine sales to manufacturers, and G. E. Spain, in charge of power unit sales to distributors.

F. Liebich

Harnischfeger Corp., Milwaukee, Wis., announces the appointment of Frank Liebich as district manager in charge of the company's operations in the Detroit area. Mr. Liebich, with the company since 1924, served last with the Chicago office.

C. O. Bartlett and Snow Co., Cleveland, Ohio, announces the appointment of W. A. Meddick to a position in the sales department.

Chase Bag Co. has moved its general sales department office, Chicago sales office and traffic department office from 166 W. Jackson Blvd. to Suite 1808 at 309 W. Jackson Blvd., Chicago, Ill.

Timken Steel and Tube Co., Canton, Ohio, announces the election of Frank L. Gibbons as vice-president in charge of sales. Mr. Gibbons has been associated with the steel business since 1908.

Spencer Lens Co., Buffalo, N. Y., announces that American Optical Co. has acquired a substantial interest in it. Business will continue under the name of Spencer Lens Co., and policies and personnel will remain the same.

The Babcock & Wilcox Tube Co., Beaver Falls, Penn., announces the appointment of R. P. Kilsby to the managership of its western sales territory. He will make his headquarters at the company's Chicago office in the Marquette Building.

Halafax Explosives Co., Los Angeles, Calif., has purchased a Northrup cabin plane so that its executives may make flying trips throughout the Southwest to the quarrying, mining and construction projects where its products are in use. Bill Hottle, experienced airlines flier, is pilot.

Commercial Shearing & Stamping Co., Youngstown, Ohio, announces that its patents on a three-way hydraulic dumping system for truck bodies were recently declared valid in a federal court decision. The company's three-way dump truck bodies are so equipped that they may dump either to the rear, the right, or the left, as need requires.

The Lincoln Electric Co. and the **John Huntington Polytechnic Institute,** Cleveland, Ohio, are co-operating in offering a special five-day course in welding engineering. This course answers a growing demand for intensive advanced welding training, and is planned to meet the needs of engineers, welding supervisors and foremen. Begun on August 26, this five-day course will be conducted once each month, except during November, through May, 1936. The Lincoln Electric Co. is also demonstrating the use of the latest arc welding machines and new type electrodes in Booth H-3 at the National Metal Exposition, Chicago, Ill., September 30 to October 4.

Trade Literature

Mills. An 8-page bulletin introduces the new "Bowl Mill" used for coal grinding and firing kilns and for pulverizing other nonmetallic minerals in closed circuit with Raymond mechanical air separator. RAYMOND BROS. IMPACT PULVERIZER CO., Chicago, Ill.

Bin Level Indicator. A folder gives complete description and diagrams of the "Bin-Dicator." Specifications and applications are included. RIPLEY MANUFACTURING CO., Wayne, Mich.

Wire Cloth. Catalog 40, 56 pages, presents the complete line of Audubon wire cloth, in mesh, space, flexible types. Specifications, list prices and tables of useful information are included. AUDUBON WIRE CLOTH CORP., Philadelphia, Penn.

Belt Conveyors. Catalog 610, 112 pages, is virtually a text book on standardized conveyors and their accessories. Applications of conveyor belts in leading industries are illustrated, and tables of dimensions are included. THE JEFFREY MANUFACTURING CO., Columbus, Ohio.

Metallic Soaps. A 44-page planographed booklet of special interest to research men gives the physical and chemical properties of metallic soaps and their uses. Their insolubility, as distinguished from alkali soaps, is taken up in detail. A bibliography is included. METASAP CHEMICAL CO., Harrison, N. J.

Classified Directory of Advertisers in this Issue of Rock Products

For alphabetical index, see page 2

This classified directory of advertisers in this issue is published as an aid to the reader. Every care is taken to make it accurate, but ROCK PRODUCTS assumes no responsibility for errors or omissions. The publishers will appreciate receiving notice of omissions or errors, or suggestions

Acetylene Welding Rod
American Steel & Wire Co.

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The Dorr Co.
F. L. Smidth & Co.

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Curtis Pneumatic Machy. Co.
Fuller Co.
Gardner-Denver Co.
Nordberg Mfg. Co.
Traylor Eng. & Mfg. Co.
F. L. Smidth & Co.

Air Filters
Fuller Co.

Air Hoists
Chicago Pneumatic Machy. Co.

Air Separators
Bradley Pulverizer Co.
Raymond Bros. Impact Pulv. Co.
Universal Road Machy. Co.

Babbitt Metal
Joseph T. Ryerson & Son, Inc.

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Lima Locomotive Works, Inc. (Ohio Power Shovel Co.)

Backfillers
Austin-Western Road Machy. Co.
Bucyrus-Erie Co.
Harnischfeger Corp.
Lima Locomotive Works, Inc. (Ohio Power Shovel Co.)

Ball Bearings
S K F Industries, Inc.

Balls (Grinding, See Grinding Balls)

Balls (Tube Mill, etc.)
Allis-Chalmers Mfg. Co.
F. L. Smidth & Co.

Bar Benders and Cutters
Koehring Co.

Batchers
Fuller Company

Bearings
Chain Belt Co.
Link-Belt Co.
Joseph T. Ryerson & Son, Inc.
S K F Industries, Inc.
Timken Roller Bearing Co.

Bearings (Anti-Friction)
S K F Industries, Inc.
Timken Roller Bearing Co.

Bearings (Roller)
S K F Industries, Inc.
Timken Roller Bearing Co.

Bearings (Tapered Roller)
Timken Roller Bearing Co.

Bearings (Thrust)
S K F Industries, Inc.
Timken Roller Bearing Co.

Belting (Elevator and Conveyor)
B. F. Goodrich Co.
Robins Conveying Belt Co.

Belting (Transmission)
B. F. Goodrich Co.

Belting (V Type)
B. F. Goodrich Co.

Bin—Dicator
Ripley Mfg. Co.

Bin Gates
Chain Belt Co.
Fuller Co.
Industrial Brownhoist Corp.
Link-Belt Co.
Traylor Eng. & Mfg. Co.
Universal Road Machy. Co.

Bins
Austin-Western Road Machy. Co.
Traylor Eng. & Mfg. Co.
Universal Road Machy. Co.

Blasting Machines
Atlas Powder Co.
E. I. du Pont de Nemours & Co., Inc.

Blasting Cap Protectors
B. F. Goodrich Co.

Blasting Powder (See Powder, Blasting)

Blasting Supplies
Atlas Powder Co.
E. I. du Pont de Nemours & Co., Inc.

Blocks (Pillow, Roller Bearing)
Link-Belt Co.
S K F Industries, Inc.
Timken Roller Bearing Co.

Blocks (Sheave)
American Manganese Steel Co.

Boilers
Babcock & Wilcox Co.
Combustion Engineering Corp.

Boots and Shoes
B. F. Goodrich Co.

Breakers (Primary)
Smith Engineering Works
Williams Patent Crusher & Pulv. Co.

Buckets (Clamshell, Grab, Orange Peel, etc.)
Blaw-Knox Co.
Harnischfeger Corp.
Hayward Company
Industrial Brownhoist Corp.
Link-Belt Co.

Buckets (Dragline and Slackline)
American Manganese Steel Co.
Bucyrus-Erie Co.

Buckets (Dredging and Excavating)
Harnischfeger Corp.

Buckets (Elevator and Conveyor)
Chain Belt Co.
Cross Engineering Co.
Hendrick Mfg. Co.
Industrial Brownhoist Corp.
Jeffrey Mfg. Co.
Link-Belt Co.

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Koehring Co.

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Manganese Steel Forge Co., Inc.

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American Steel & Wire Co
Broderick & Bascom Rope Co.
Link-Belt Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Calcining Kettles (Gypsum)
J. B. Ehrsam & Sons Mfg. Co.

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Ensign-Bickford Co.

Caps (Blasting)
Atlas Powder Co.
E. I. du Pont de Nemours & Co., Inc.

Car Pullers
Link-Belt Co.

Cars (Quarry and Gravel Pit)
Austin-Western Road Machy. Co.

Castings
Babcock & Wilcox Co.
Eagle Iron Works (Grey Iron)
Link-Belt Co.
Timken Roller Bearing Co.

Cement Making Machinery
F. L. Smidth & Co.

Cement Process
Cement Process Corp.

Cement Pumps
Fuller Co.
F. L. Smidth & Co.

Central Mixing Plants (Concrete)
Chain Belt Co.

Chain (Dredge and Steam Shovel)
Bucyrus-Erie Co.
Jeffrey Mfg. Co.

Chain (Elevating and Conveying)
American Manganese Steel Co.
Chain Belt Co.
Link-Belt Co.

Chain Drives
Chain Belt Co.

Chain Systems (Kilns)
F. L. Smidth & Co.

Chute Lining
B. F. Goodrich Co.

Chutes and Chute Liners
American Manganese Steel Co.
Cross Engineering Co.

Clarifiers
The Dorr Co.

Classifiers
The Dorr Co.
Hardinge Co., Inc.
Knickerbocker Co.
Link-Belt Co.

Clay Working Machinery
Bonnot Company

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American Steel & Wire Co.
Broderick & Bascom Rope Co.
Williamsport Wire Rope Co.

Coal Crushers and Rolls
Austin-Western Road Machy. Co.
Williams Patent Crusher & Pulv. Co.

Coal Pulverizing Equipment
Babcock & Wilcox Co.
Bonnot Company
Bradley Pulverizer Co.
Gruendler Crusher & Pulv. Co.
Pennsylvania Crusher Co.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Williams Patent Crusher & Pulv. Co.

Compressed Air Hoists
Gardner-Denver Co.

Compressed Air Rock Drills
Chicago Pneumatic Tool Co.
Gardner-Denver Co.

Compressors (See Air Compressors)

Concentrators (Slurry, etc.)
The Dorr Co.

Concrete Slab Raising Equipment (Mud-Jack)
Koehring Co.

Conveyor Idlers and Rolls
Chain Belt Co.
Link-Belt Co.

Conveyors and Elevators
Earle C. Bacon, Inc.
Chain Belt Co.
Fuller Company
Industrial Brownhoist Corp.
Jeffrey Mfg. Co. (Vibrating)
Lewistown Fdy. & Mach. Co.
Link-Belt Co.
Robins Conveying Belt Co.
F. L. Smidth & Co.
Smith Engineering Works
Traylor Eng. & Mfg. Co
Universal Road Machy. Co.

Conveyors (Pneumatic)
Fuller Company

Conveyors (Screw)
Link-Belt Co.

Coolers (See Kilns and Coolers, Rotary)

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F. L. Smidth & Co.

Couplings (Flexible and Shaft)
Chain Belt Co.
Link-Belt Co.

Couplings (Hose, Pipe, etc.)
B. F. Goodrich Co.

Cranes (Air Powered)
Curtis Pneumatic Machy. Co.

Cranes (Clamshell)
Austin-Western Road Machy. Co.
Bucyrus-Erie Co.
Harnischfeger Corp.
Koehring Co.

Cranes (Crawler and Locomotive)
Austin-Western Road Machy. Co.
Bucyrus-Erie Co.
Harnischfeger Corp.
Industrial Brownhoist Corp.
Koehring Co.
Lima Locomotive Works, Inc (Ohio Power Shovel Co.)
Link-Belt Co.

Cranes (Excavator
Koehring Co.

Cranes (Overhead Traveling Electric)
Harnischfeger Corp.
Industrial Brownhoist Corp.

Crusher Parts
American Manganese Steel Co.
Pennsylvania Crusher Co.

Crushers (Hammer)
Austin-Western Road Machy. Co.
Dixie Machy. Mfg. Co.
Gruendler Crusher & Pulv. Co.
Pennsylvania Crusher Co.
Williams Patent Crusher & Pulv. Co.

Crushers (Jaw and Gyratory)
Allis-Chalmers Mfg. Co.
Austin-Western Road Machy. Co.
Earle C. Bacon, Inc. (Jaw))
Good Roads Machy. Corp. (Jaw)
Lewistown Fdy. & Mach. Co.
Nordberg Mfg. Co.
Pennsylvania Crusher Co.
Smith Engineering Works
Traylor Eng. & Mfg. Co.
Universal Road Machy. Co.

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For material handling equipment, such as that shown above, Gulf supplies a special lubricant—used in many leading mills—which keeps friction, wear and maintenance expense at a minimum. Gulf High Pressure Grease has been found most economical for use in pressure fittings on belt conveyors, such as shown at the right.

The Gulf Engineer will assist you in the selection and application of the most efficient oils and greases for your equipment

HERE is one big advantage in using Gulf quality lubricants in your mill: You receive, without charge, the complete cooperation of a trained Gulf lubrication engineer.

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Leading cement mills report real economies from the use of Gulf products—savings in maintenance and in lubrication costs. If you are not using Gulf products, give them a trial.

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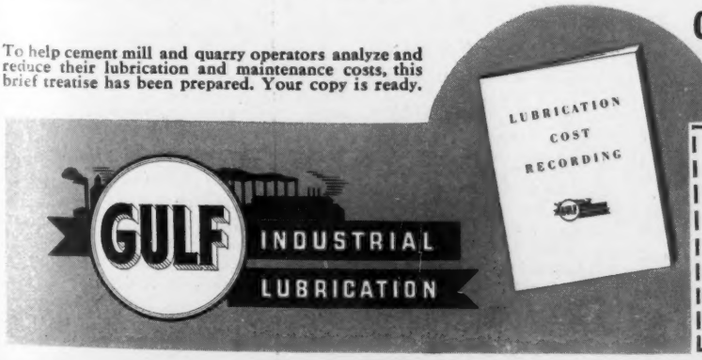
To help cement mill and quarry operators analyze and reduce their lubrication and maintenance costs, this brief treatise has been prepared. Your copy is ready.



GULF REFINING COMPANY, R.P.-10
3800 Gulf Building, Pittsburgh, Pa.

Please send me without obligation, the booklet "Lubrication Cost Recording."

Name.....

Company.....

Address.....

Classified Directory of Advertisers in this Issue of ROCK PRODUCTS

For alphabetical index, see page 2

Crushers (Reduction)
Bonnot Company

Crushers (Rotary)
J. B. Ehrsam & Sons Mfg. Co.

Crushers (Single Roll)
Austin-Western Road Machy. Co.
Jeffrey Mfg. Co.
Link-Belt Co.
McLanahan & Stone Corp.
Pennsylvania Crusher Co.

Crushing Rolls
Allis-Chalmers Mfg. Co.
Babcock & Wilcox Co.
Jeffrey Mfg. Co.
Traylor Eng. & Mfg. Co.

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Blaw-Knox Co.

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Harnischfeger Corp.

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Atlas Powder Co.
E. I. du Pont de Nemours & Co., Inc.

Dewatering Machines
The Dorr Co.

Diaphragms (Pump)
B. F. Goodrich Co.

Dippers (Manganese Steel)
American Manganese Steel Co.

Dippers and Teeth (Steam Shovel)
American Manganese Steel Co.
Bucyrus-Erie Co.
The Frog, Switch & Mfg. Co.

Dirt Moving Equipt. (Dumptor)
Koehring Co.

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Bucyrus-Erie Co.
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Draglines
Bucyrus-Erie Co.
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Link-Belt Co.

Draglines (Gasoline or Electric)
Koehring Co.

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Austin-Western Road Machy. Co.
Bucyrus-Erie Co.
Harnischfeger Corp.
Lima Locomotive Works, Inc. (Ohio Power Shovel Co.)

Dragline Cableway Excavators
Bucyrus-Erie Co.
Link-Belt Co.
Sauerman Bros.

Dragline Excavators (Walking)
Bucyrus-Monighan Co.

Dredge Pumps (See Pumps, Dredging)

Dredges
Bucyrus-Erie Co.
Hayward Co.
Hetherington & Berner, Inc.
Morris Machine Works

Dredging Sleeves
B. F. Goodrich Co.

Drill Bits
Timken Roller Bearing Co.

Drills, Hammer (See Hammer Drills)

Drills
Bucyrus-Erie Co.
Timken Roller Bearing Co.

Drills (Diamond Core)
Chicago Pneumatic Tool Co.

Drills (Rock)
Chicago Pneumatic Tool Co.
Gardner-Denver Co.

Drill Sharpening Machines
Gardner-Denver Co.

Drives (Short Center)
Allis-Chalmers Mfg. Co.

Dryers
Allis-Chalmers Mfg. Co.
Babcock & Wilcox Co.
Bonnot Company
Combustion Engineering Corp.
Hardinge Company, Inc.
Traylor Eng. & Mfg. Co.

Dumptors
Koehring Co.

Dust Collecting Systems
Allis-Chalmers Mfg. Co.
Blaw-Knox Co.

Dust Conveying Systems
Fuller Company

Dynamite
Atlas Powder Co.
E. I. du Pont de Nemours & Co., Inc.

Electric Cables and Wires
American Steel & Wire Co.
John A. Roebling's Sons Co.

Electric Mine Hoists
Nordberg Mfg. Co.

Electric Power Equipment
Allis-Chalmers Mfg. Co.

Engineers
Bonnot Company
The Dorr Co.
Hetherington & Berner, Inc.
Productive Equipment Corp.
F. L. Smidth & Co.

Engines (Diesel)
Chicago Pneumatic Tool Co.
Nordberg Mfg. Co.

Engines (Steam)
Morris Machine Works

Excavating Machinery (See Shovels, Cranes, Buckets, etc.)

Excavators (Crawling Tractor)
Koehring Co.

Excavators (Dragline)
Koehring Co.

Explosives
Atlas Powder Co.
E. I. du Pont de Nemours & Co., Inc.

Fans (Exhaust)
Jeffrey Mfg. Co.

Feeders
Babcock & Wilcox Co. (Pulverized Coal)
Chain Belt Co.
Fuller Co. (Cement and Pulverized Material)
Hardinge Company, Inc.
Jeffrey Mfg. Co. (Pan and Tube)
Smith Engineering Works (Plate)

Forges (Oil)
Gardner-Denver Co.

Furnaces
Combustion Engineering Corp.

Fuses (Detonating and Safety)
Ensign-Bickford Co.

Gaskets
B. F. Goodrich Co.

Gasoline
Texas Company

Gears and Pinions
Chain Belt Co.
Link-Belt Co.

Gears (Spur, Helical and Worm)
Jeffrey Mfg. Co.

Gelatin and Semi-Gelatin (See Explosives)

Grapples (Stone)
Hayward Co.

Grease
Gulf Refining Co.
Texas Company

Grinding Balls
Babcock & Wilcox Co.

Grizzlies
American Manganese Steel Co.
Jeffrey Mfg. Co. (Vibrating)
Productive Equipment Corp.
Robins Conveying Belt Co.
Smith Engineering Works
Traylor Eng. & Mfg. Co.

Grizzly Feeders
Jeffrey Mfg. Co.
Traylor Eng. & Mfg. Co.

Hammer Drills
Chicago Pneumatic Tool Co.
Gardner-Denver Co.

Hammer Mills (See Crushers)

Hoists
Chicago Pneumatic Tool Co.
Curtis Pneumatic Machy. Co.
Gardner-Denver Co.
Harnischfeger Corp.
Link-Belt Co.

Hose (Water, Steam, Air Drill, Pneumatic, Sand Suction and Discharge)
Chicago Pneumatic Tool Co.
B. F. Goodrich Co.

I-Beam Trolleys
Curtis Pneumatic Machy. Co.

Indicators (Bin)
Ripley Mfg. Co.

Kilns and Coolers (Rotary)
Allis-Chalmers Mfg. Co.
Bonnot Company
F. L. Smidth & Co.
Traylor Eng. & Mfg. Co.

Kominuters (See Mills)

Lighters, Hot Wire (For Safety Fuse)
Ensign-Bickford Co.

Lime Handling Equipment
Fuller Company
Link-Belt Co.
Raymond Bros. Impact Pulv. Co.

Lime Kilns (See Kilns and Coolers, Rotary)

Linings (Iron for Ball and Tube Mills). See Mill Liners)

Linings (Rubber for Ball and Tube Mills)
B. F. Goodrich Co.

Loaders and Unloaders
Bucyrus-Erie Co.
Fuller Company
Jeffrey Mfg. Co.
Link-Belt Co.

Locomotive Cranes (See Cranes, Crawler and Locomotive)

Locomotives (Geared)
Lima Locomotive Works, Inc.

Locomotives (Steam, Gas and Electric)
Jeffrey Mfg. Co.
Lima Locomotive Works, Inc.

Locomotives (Storage Battery)
Jeffrey Mfg. Co.

Log Washer
McLanahan & Stone Corp.
Smith Engineering Works

Lubricants
American Steel & Wire Co. (Wire Rope)
Broderick & Bascom Rope Co. (Wire Rope)
Gulf Refining Co.
Texas Company

Machinery Guards
Harrington & King Perforating Co.

Manganese Steel Castings
American Manganese Steel Co.
The Frog, Switch & Mfg. Co.

Manganese Steel Parts
American Manganese Steel Co.

Manganese Steel Parts
Manganese Steel Forge Co., Inc.

Manganese Steel (Plates and Sheets)
Manganese Steel Forge Co., Inc.

Mechanical Rubber Goods
B. F. Goodrich Co.

Mill Liners and Linings (Iron for Ball and Tube Mills)
Babcock & Wilcox Co.
F. L. Smidth & Co.

Mills, Grinding (Ball, Tube, etc.) (See also Crushers, Hammer)
Allis-Chalmers Mfg. Co.
American Pulverizer Co.
Bonnot Company
Bradley Pulverizer Co.
Hardinge Co., Inc.
Knickerbocker Co.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Traylor Eng. & Mfg. Co.
Williams Patent Crusher & Pulv. Co.

Mine Handling Equipment
Chain Belt Co.

Mixers (Concrete)
Koehring Co.

Motors and Generators (Electric Units)
Allis-Chalmers Mfg. Co.
Harnischfeger Corp.

Multiple V-Belts
B. F. Goodrich Co.

Nitramon
E. I. du Pont de Nemours & Co., Inc.

Nozzles (Gravel Washing)
Chain Belt Co.

Oil Burners
Babcock & Wilcox Co.
F. L. Smidth & Co.

Let's Look at Cordeau -- for Wagon Drill Holes

Factors that dictate the use of wagon-mounted drills often indicate the use of Cordeau. Deep vertical holes of medium size are easier to load, and unquestionably "go" with added force, when Cordeau is used as the detonating agent. Where the rock formation necessitates "deck" loads, Cordeau offers a big saving. The line of Cordeau, extending from the top to the bottom of the hole insures simultaneous detonation of each load . . . Cordeau pays in *at least* five ways. Why not write for the Cordeau Book? THE ENSIGN-BICKFORD CO., *Simsbury, Connecticut.*

CORDEAU PAYS IN 5 WAYS

1. Simplified loading
2. Less Hazard
3. More work from your explosives
4. Better fragmentation
5. Fewer but bigger shots (Equipment moved less often)

Write for the Cordeau Book.

CORDEAU
DETONATING FUSE
BICKFORD
ALSO SAFETY FUSE *Since* 1836

CB-47

THE ENSIGN-BICKFORD COMPANY

Classified Directory of Advertisers in this Issue of ROCK PRODUCTS

For alphabetical index, see page 2

Oils (Lubricating)
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Overhead Traveling Cranes
Curtis Pneumatic Machy. Co.

Packings (Pump, Valve, etc.)
B. F. Goodrich Co.

Paint (Asphalt)
Texas Company

Pavers (Concrete)
Koehring Co.

Perforated Metal
Chicago Perforating Co.
Cross Engineering Co.
Harrington & King Perforating Co.
Hendrick Mfg. Co.
Morrow Mfg. Co.

Plates (Double Corrugated)
Hendrick Mfg. Co.

Pneumatic Drills (See Drills)

Portable Conveyors
Fuller Company
Link-Belt Co.

Portable Crushing and Screening Unit
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Good Roads Machy. Corp.
Smith Engineering Works
Williams Patent Crusher & Pulv. Co.

Powder (Blasting)
Atlas Powder Co.
E. I. du Pont de Nemours & Co., Inc.

Power Transmission Equipment
Chain Belt Co.
S K F Industries, Inc.

Pulverizers (See also Crushers, Mills, etc.)
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Babcock & Wilcox Co.
Bonnot Company
Bradley Pulverizer Co.
Dixie Machy. Mfg. Co.
Jeffrey Mfg. Co.
Knickerbocker Co.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Universal Road Machy. Co.
Williams Patent Crusher & Pulv. Co.

Pulverizer Parts
American Manganese Steel Co.

Pumps (Air Lift)
Fuller Company

Pumps (Cement)
Fuller Company

Pumps (Cement Slurry)
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The Dorr Co.
Morris Machine Works
F. L. Smidth & Co.
A. R. Wilfley & Sons

Pumps (Centrifugal)
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Hetherington & Berner, Inc.
Morris Machine Works
A. R. Wilfley & Sons

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Bucyrus-Erie Co.
Morris Machine Works

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Babcock & Wilcox Co.

Pumps (Sand and Gravel)
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American Manganese Steel Co.
Hetherington & Berner, Inc.
Morris Machine Works
A. R. Wilfley & Sons

Ready Mixed Concrete (Truck Mixer Bodies)
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Chain Belt Co.

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Koehring Co.

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Rock Drills (See Drills, Rock)

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Roller Bearings
S K F Industries, Inc.
Timken Roller Bearing Co.

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Texas Company

Roofing and Siding (Steel)
Joseph T. Ryerson & Son, Inc.

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Rubber Covered Screens
B. F. Goodrich Co.

Sand and Gravel Screening and Washing Equipment
Universal Road Machy. Co.

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Smith Engineering Works

Sand Settling Tanks
Link-Belt Co.
Smith Engineering Works

Scrapers (Power Drag)
Austin-Western Road Machy. Co.
Harnischfeger Corp.
Link-Belt Co.
Sauerman Bros.

Screens
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Audubon Wire Cloth Corp.
Chicago Perforating Co.
Cleveland Wire Cloth & Mfg. Co.
Cross Engineering Co.
Harrington & King Perf. Co.
Hendrick Mfg. Co.
Industrial Brownhoist Corp.
Jeffrey Mfg. Co.
Link-Belt Co.
Manganese Steel Forge Co., Inc.
Morrow Mfg. Co.
National Wire Cloth Co.
Nordberg Mfg. Co.
Productive Equipment Corp.
John A. Roebling's Sons Co.
Smith Engineering Works
Traylor Eng. & Mfg. Co.
Universal Road Machy. Co.
Universal Vibrating Screen Co.

Screens, Scalping (Hercules and Standard)
Smith Engineering Works

Screens (Vibrating)
Austin-Western Road Machy. Co.
Link-Belt Co.
Nordberg Mfg. Co.
Productive Equipment Corp.
Robins Conveying Belt Co.
Smith Engineering Works
Universal Vibrating Screen Co.
Williams Patent Crusher & Pulv. Co.

Screens, Washing (Hercules, Ajax and Standard)
Smith Engineering Works

Screw Rewasher (Single and Twin)
Smith Engineering Works

Scrubbers, Washers
Hardinge Company, Inc.
Knickerbocker Co.
Lewistown Fdy. & Mach. Co.
Smith Engineering Works

Seal Rings
Traylor Eng. & Mfg. Co.

Separators (Slurry)
F. L. Smidth & Co.

Shovels, Power (Steam, Gas, Electric, Diesel, Oil)
Bucyrus-Erie Co .
Harnischfeger Corp.
Industrial Brownhoist Corp.
Koehring Co.
Lima Locomotive Works, Inc. (Ohio Power Shovel Co.)
Link-Belt Company

Silos
F. L. Smidth & Co.

Skip Hoists and Skips
Link-Belt Co.

Slings (Wire Rope)
American Cable Co., Inc.
American Steel & Wire Co.
A. Leschen & Sons Rope Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Sockets (Wire Rope)
American Steel & Wire Co.

Soft Stone Eliminator
Knickerbocker Co.

Speed Reducers
Link-Belt Co.
Traylor Eng. & Mfg. Co.

Sprockets and Chain
Chain Belt Co.
Jeffrey Mfg. Co.

Steam Shovel Repair Parts
American Manganese Steel Co.

Steel (Abrasion Resisting)
Joseph T. Ryerson & Son, Inc.

Steel Bars
Timken Roller Bearing Co.

Steel (Bars, Shapes, Plates, etc.)
Joseph T. Ryerson & Son, Inc.

Steel (Electric Furnace)
Timken Roller Bearing Co.

Steel (Open Hearth)
Timken Roller Bearing Co.

Steel (Special Alloy)
Timken Roller Bearing Co.

Steel (Special Analysis)
Timken Roller Bearing Co.

Stokers
Babcock & Wilcox Co.
Combustion Engineering Corp.

Tanks
Combustion Engineering Corp.
The Dorr Co.
Link-Belt Co.

Thickeners
The Dorr Co.

Tires and Tubes
B. F. Goodrich Co.

Track Equipment
Nordberg Mfg. Co.

Track Shifters
Nordberg Mfg. Co.

Tractors
Koehring Co.

Tramways (Aerial Wire Rope)
American Steel & Wire Co.
Broderick & Bascom Rope Co.
A. Leschen & Sons Rope Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Transmission Belting (See Belting)

Transmission Machinery
Allis-Chalmers Mfg. Co.
Timken Roller Bearing Co.

Trukmixers
Blaw-Knox Co.

Tube Mills (See Mills, Ball, Tube, etc.)

Tube Mill Liners (See Mill Liners)

Tubing (Blasting)
B. F. Goodrich Co.

Tubing (Seamless Steel)
Timken Roller Bearing Co.

Underground Shovels
Nordberg Mfg. Co.

Valves (Pump)
B. F. Goodrich Co.

Vibrating Screens (See Screens, Vibrating)

Washers (Sand, Gravel and Stone)
Allis-Chalmers Mfg. Co.
Austin-Western Road Machy. Co.
The Dorr Co.
Eagle Iron Works
Knickerbocker Co.
Link-Belt Co.
Traylor Eng. & Mfg. Co.
Universal Road Machy. Co.

Waste Heat Boilers
Combustion Engineering Corp.

Weigh-Mix
Koehring Co.

Welding and Cutting Apparatus
Harnischfeger Corp.

Welding Rod
American Steel & Wire Co.
Joseph T. Ryerson & Son, Inc.

Welding Wire
American Steel & Wire Co.
John A. Roebling's Sons Co.

Wire (Manganese Steel)
Manganese Steel Forge Co., Inc.

Wire (Rubber Insulated)
American Steel & Wire Co.

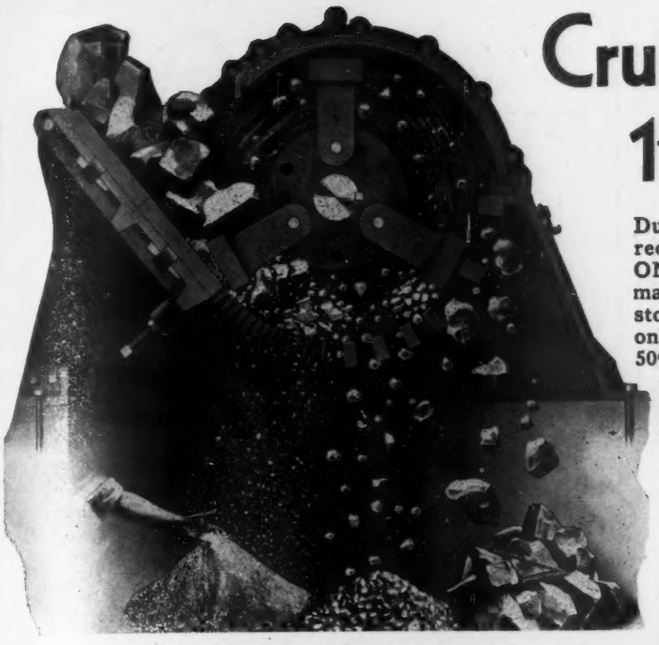
Wire Cloth
Audubon Wire Cloth Corp.
Cleveland Wire Cloth & Mfg. Co.
Manganese Steel Forge Co., Inc.
National Wire Cloth Co.
John A. Roebling's Sons Co.

Wire Rope
American Cable Co., Inc.
American Steel & Wire Co.
Broderick & Bascom Rope Co.
A. Leschen & Sons Rope Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Wire Rope Fittings
American Cable Co., Inc.
American Steel & Wire Co.
Broderick & Bascom Rope Co.
A. Leschen & Sons Rope Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Wire Rope Slings (See Slings, Wire Rope)

Wire Rope Sockets (See Sockets, Wire Rope)



Crushes 36" Rock to 1¼" in One Operation

Due to their ability to handle power shovel loaded rock and reduce to commercial sizes in ONE OPERATION WITH ONE CRUSHER, Williams Hammer Crushers have shown remarkable savings in many quarries. By handling the large stone much sledging and secondary blasting is avoided. As only one crusher is required there is a saving in investment of 50% to 75% as you also save in smaller buildings, fewer foundations, conveyors, drives and motors. A cubular product free from slivers and slabs is another Williams advantage. Let us tell you about a Williams for your work. A size for every job. Capacities 3 to 300 tons per hour.

Williams Patent Crusher & Pulverizer Co.
800 St. Louis Ave., St. Louis, Mo.

Chicago	New York	San Francisco
37 W. Van Buren St.	15 Park Row	326 Rialto Bldg

THE WILLIAMS PATENT CRUSHER & PULVERIZER CO. ST. LOUIS, MO. U.S.A. TRADE MARK
REG. U.S. PAT. OFF.

Williams
OLDEST AND LARGEST BUILDERS OF HAMMERMILLS IN THE WORLD
PATENT CRUSHERS GRINDERS SHREDDERS

SHAY GEARED LOCOMOTIVES

---Built for Quarry Service!

THERE'S no question about the adaptability of Shay Geared Locomotives to quarry service. They are built for it.

Shay Geared Locomotives are rugged. This fits them to withstand abuse and to give continuous, dependable operation under the most severe conditions.

Shay Geared Locomotives have great power. Their three-cylinder engines start heavy loads quickly and pull them up hard-to-climb grades without difficulty or delay. Speedier car movement keeps quarry production at a maximum.

Because of these advantages . . . and others we will gladly tell you about . . . the Shay is the most reliable locomotive investment you can make. Write for catalog.

LIMA LOCOMOTIVE WORKS, Incorporated
LIMA, OHIO
Sales Office: 60 E. 42nd St., New York, N. Y.

GAYCO

BETTER THAN EVER

RELIANCE

CENTRIFUGAL AIR SEPARATOR

Now you get 25 to 40% increased capacity with 25 to 30% greater recovery of fines. Product is more uniform—you get increased capacity—cleaner tailings and higher efficiency than is possible with any other air separator. Delivers products of any desired screen analysis from 60 to 400 mesh.

Many of these machines have been running 24 hours per day for years without interruption. Rugged construction plus high quality, wear-resisting material assures long, efficient, economical service.

RELIANCE ALL-STEEL CRUSHER

The one crusher that can "take it." The first Reliance All-Steel Crusher built more than 20 years ago—is still earning profits. That's the kind of service correct design — wear-resisting material and rugged construction results in. Ask for full details.

RUBERT M. GAY
DIVISION OF
UNIVERSAL ROAD MACHINERY CO.
Sales office: 114 Liberty St., New York, N.Y. Factory: Kingston, N.Y.

Also Manufacturers of:

Bucket Elevators	Heating Kettles	Sand, Gravel Spreaders
Bin Gates	Pulverizers	Wash Boxes
Belt Conveyors	Rock Crushers	Complete crushing, screening and washing plants for quarried stone or sand and gravel.
Coal Breakers	Revolving Screens	
Car Unloaders	Street Sweepers	
Chip Spreaders	Scarifiers	
Feeders	Storage Bins	
Grizzlies		

RUBERT M. GAY
Division of
UNIVERSAL ROAD MACHINERY CO.
Sales office: 114 Liberty St., New York, N.Y. Factory: Kingston, N.Y.

Gentlemen:
Please send me further details and specifications on the equipment checked below:

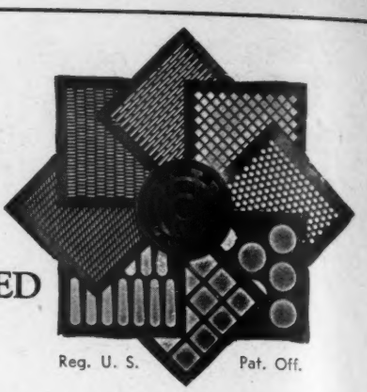
.....GAYCO RELIANCE AIR SEPARATORS
.....RELIANCE CRUSHERS
.....(Other equipment listed above)

.....

Name..... Title.....

Address .....

The PLUS in PERFORATED PLATE



Reg. U. S. Pat. Off.

Hendrick customers find a high level of accuracy in every delivery of plate for their vibrating screens. This assures the highest capacity of production.

Because Hendrick Perforated Plate always fits well, no time is lost jobbing when operations should be in full swing.

Finally, Hendrick customers are often gratified with the extra service life of their plate.

These features comprise the *plus* in perforated plate . . . as supplied by Hendrick.

To the many who prefer it, we furnish Hendrick High-Carbon, Heat-Treated, Double-Corrugated Plate.

HENDRICK MANUFACTURING CO.

47 Dundaff St., Carbondale, Pa.

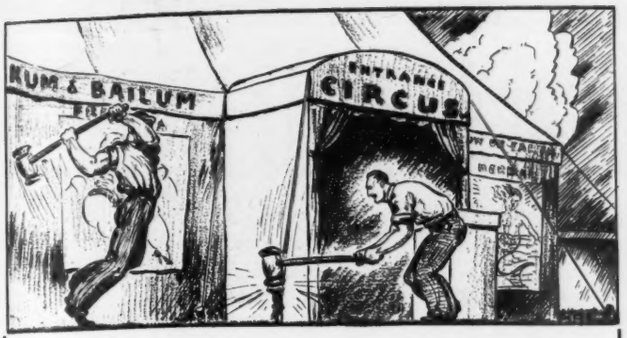
SALES OFFICES IN PRINCIPAL CITIES
PLEASE CONSULT TELEPHONE DIRECTORY

Makers of Elevator Buckets of all types, Mitco Open Steel Flooring, Mitco Shur-Site Treads and Mitco Armorgrids. Light and Heavy Steel Plate Construction.

4465 W. National Ave., Milwaukee, Wis.

Warehouses and Service Stations:

Hoboken Memphis Jacksonville Seattle
Dallas Los Angeles San Francisco



TWO BLOWS or ONE

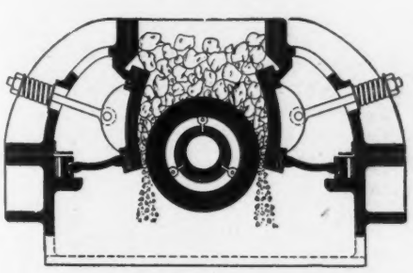
We often stood by and watched the circus roustabouts drive stakes, working with perfect rhythm and at high speed. The Bonnot Crusher using the same principle, two blows instead of one, no idle back stroke, or 750 blows per minute, turns out quality crushed material at high speed—no wasted effort.

Users say:

"We take pleasure in recommending this crusher."—Ohio.

"We believe that you have a knockout in the line of crushers."—Texas.

SPEED



Not a roll crusher. Featuring slow creep mantle for distribution of wear

Manufactured under U. S. Patent No. 1946763

750 BLOWS PER MINUTE

THE BONNOT CO.

CANTON, OHIO

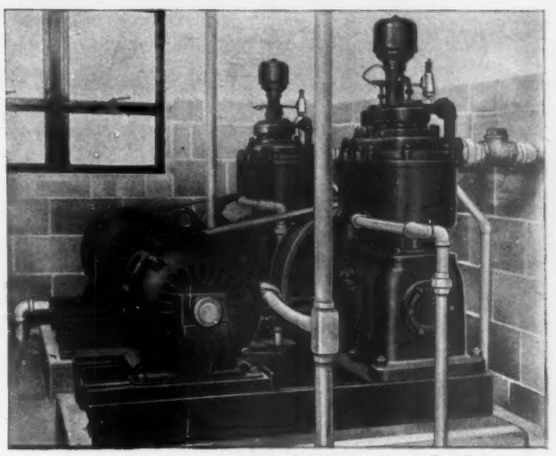
— SINCE 1891 —

New York Office: 59 Church Street

Save Costly **SHUTDOWNS!**

CURTIS COMPRESSORS

stay on the job



Curtis Compressors at the Shreveport, La. Municipal Incinerator.

Air is the life blood for hundreds of mill and factory tools and equipment. If the compressor fails, work stops, production and overhead costs go up.

Curtis compressors save the annoyance and expense of frequent shutdowns for repairs and overhaul. They are built of the finest materials, precision made, are extremely rugged and simple in design. 41 years' experience in building fine compressors is reflected by those features that contribute to long life and dependability.

Check these Curtis advantages:

Timken Roller Bearings. Carbon-free Disc Valves. Centro-ring Oiling. Fully Enclosed. All Parts Readily Accessible. Capacities up to 360 CFM. Send for detailed bulletin C4B and performance surveys.

CURTIS PNEUMATIC MACH. CO.
1988 Kienlen Ave., St. Louis, Missouri
New York . . . Chicago . . . San Francisco

CURTIS

COMPRESSORS — AIR HOISTS
I-BEAM CRANES AND TROLLEYS

DIXIE NON-CLOG HAMMER MILL

•

. . . . . End Maintenance Worries . . .

THE exclusive design of the breaker plate does that with its tremendous wearing surface—a surface having twenty-six times the area of any standard type of breaker plate. But—this is only one of many reasons for DIXIE economy. The DIXIE Hammer Mill tackles wet or sticky material without clogging. It requires a single operation to reduce material to any uniform size. Unusual ruggedness, plus quality material throughout, makes for further dependability.

There are 40 sizes available for any capacity — Primary — Secondary or Fine Reduction.

Write for further facts.

DIXIE MACHINERY MFG. CO.

4209 Goodfellow Ave. • St. Louis, Mo.

Egypt's records helped to perpetuate her culture. Records are an important phase of government or business. We, too, keep a record of the performance of UNIVERSAL Super-Vibrators. These records disclose the fact that these highly efficient vibrators are giving the operators increased production at lower cost. UNIVERSAL Super-Vibrators cost less to begin with—cost less to operate—less to maintain, and pay dividends year in and year out.

There is a reason for the high percentage of UNIVERSAL reorders — these reasons are contained in the production records of the users of UNIVERSAL Super-Vibrators throughout the rock products industry. We are proud of these records and want other operators to know the reasons back of UNIVERSAL Super-Vibrator popularity.

If Interested, Write

UNIVERSAL VIBRATING SCREEN CO.

RACINE — WISCONSIN

CLASSIFIED ADVERTISEMENTS

POSITIONS WANTED — POSITIONS VACANT—two cents a word. Set in six-point type. Minimum $1.00 each insertion, payable in advance.

INFORMATION
Box numbers in care of our office. An advertising inch is measured vertically in one column. Three columns, 30 inches to the page.

CLASSIFIED — Displayed or undisplayed. Rate per column inch, $4.00. Unless on contract basis, advertisements must be paid for in advance of insertion.

Used Equipment for Sale

DUMP CARS

125 Western 4-yard. 36" gauge, heavy-duty.
30 Koppel 20-yard, all-steel air dumps.

LOCOMOTIVES

4—21-ton Vulcan 4-wheel saddle tanks, 36" gauge.
2—21-ton Porter 4-wheel saddle tanks, 36" gauge.

LOCOMOTIVE CRANES

1—50-ton Industrial 8-wheel, 50' boom.
1—25-ton Browning 8-wheel, 50' boom.
1—20-ton Industrial 8-wheel, 50' boom.
1—15-ton Industrial 8-wheel, 45' boom.
1—18-ton O&S 8-wheel, 45' boom.

BIRMINGHAM RAIL & LOCOMOTIVE COMPANY
BIRMINGHAM, ALABAMA

Used Sauerman Drag Line Equipment
Including—

1—110'—O Mast.
1—Electric two-speed Hoist without motor.
1—New 1⅜" dia. Track Cable, 924'-0 long.
1—New 1⅜" dia. Guy Cable, 320'-0 long.
1—New 1¼" dia. Guy Cable, 480'-0 long.
1—Trolley.
2—1½-yard Buckets.
Lot of used cable, guy lines, pull-in line, winch blocks, etc.
2—Sets Triple Sheave Blocks.
3—Winches for track cable.
Spare Parts.

Pittsburgh Plate Glass Company
Barberton, Ohio

Jaw Crushers—2"x4" up to 66"x84".
Crushing Rolls—12"x12" up to 54"x64"—Gyratory Crushers.
Ring Roll Mills — No. 0 and No. 1 — Swing Hammer Mills.
Rotary Fine Crushers—No. 1, No. 1½, No. 2.
Direct Heat Rotary Dryers—4'x30', 5'x30', 5½'x40', 6'x50', and 3½'x25'.
Semi-indirect Heat Dryers, 4'x30', 4½'x26', 5'x30' and 8½'x75'.
Cement Kilns—3' up to 8' diameter.
Hardinge—Marcy & Fuller—Lehigh Mills.
Raymond Mills—No. 00, No. 0 and No. 1.
Tube—Rod and Ball Mills—4' to 8' diameter.
Air Separators—3' and 10' Gayco - Screens.
Complete drying and asphalt mixing plants.

W. P. HEINEKEN
95 Liberty St., N. Y. Tel.: Barclay 7-7298.

FOR SALE

12—5-yd. 36" ga. Western Dump Cars.
6—2-yd. 36" ga. Koppel Steel V Dump Cars.
4—1½-yd. 36" ga. Insley Steel V Dump Cars.
2—3½-ton 36" ga. Whitcomb Gasoline Locomotives.
1—9x10 Sturtevant Vertical Steam Engine.
1—10x10x12 Ingersoll Steam-Driven Air Compressor.
1—9x10 Lidgerwood 3-Drum Steam Hoist.
1—8¼x8 Lidgerwood S.D. Steam Hoist.
22—12-yd. Western std. ga. Air or Hand Dump Cars.
2—40-ton Baldwin S.T. Locomotives, 14x22 cyls.
Rails—First-Class Relay Rails and Bars, 60, 70, 80, 85, 90 and 100 lb. Rails, Tie Plates, etc.

HYMAN-MICHAELS CO.
20 N. Wacker Dr. Bldg., Chicago
Railway Exchange Bldg. St. Louis, Mo.
101 West 31st St. New York

2-yd. Marion 480 Shovel-Crane.
1¼-yd. Byers Shovel-Crane.
1¼-yd. Lorain 75 Shovel.
1-yd. Koehring Crane.
¾-yd. P&H Shovel-Crane.
½-yd. Byers Shovel-Crane.
30—4-yd. Heavy Steel Stone Skips.
Compressors 110', 250', 310', 750', 265', 1000', 1200'.
Draglines and Slacklines, ½, 2, 3 yd.
Crushers, Telsmith 13A, 40.
Crushers, Jaw 10x18, 24x36.
1 No. 3 Symons Cone Crusher.
Electric Hoists, 10, 30, 60, 80 HP.
Derricks, 10, 15, 20 ton.
Clamshells, ½, ¾, 1, 1¼ yd.
Pumps 3,000, 5,000 gal.

J. T. WALSH
500 Brisbane Bldg. Buffalo, N. Y.

---

400 K. W. Busch Sulzer Diesel Unit.
100 H.P. Worthington Diesel Elec. Unit.
750-yd. and 1,250-yd. Asphalt Plants.
K44 Link Belt Cat. Dragline and Shovel.
2—2-yd. cap. Bucyrus Diesel Draglines.
½-yd. cap. Byers Shovel and Crane.
Champion 1030 Roller-Bearing Jaw Crusher.
18x36 Farrel B Jaw Crusher.
48x36 Allis-Chalmers Jaw Crusher.
Pennsylvania SX4 and SX6 Hammermills.
Clyde Lime Hydrator.
Raymond Size O Lime Pulverizer.
Keystone Gasoline-Operated Well Drill.
Sanderson 14 Electric Well Drill.
Ingersoll-Rand 34 and 50 Drill Sharpeners.
36x84 and 48x72 Rotex Screen.
550-ft. Worthington Duplex Compressor.
6-ton and 7½-ton Universal Truck Cranes.
110-ft., 220-ft. and 320-ft. Portable Compressors.

R. C. STANHOPE, INC.
875 Sixth Ave. New York, N. Y.

ELECTRICAL MACHINERY

Motors and Generators, A.C. and D.C., for sale at attractive prices. New and Rebuilt. All fully guaranteed. Write for List and Prices.

V. M. NUSSBAUM & CO.,
Fort Wayne, Indiana

30—Rock drills, Ingersoll-Rand X59.
10—Drifters, Ingersoll-Rand 570. New.
25—DCR-23 Ingersoll-Rand rock drills.
15—Sullivan plug and feather drills.
30—"Barre" pneumatic carving tools, BL, CL, DL.
1—Air receiver 42" x 8'.
25—Steel hoisting blocks, up to 20" sheave.
2—Bucket elevators 32' centers, complete.
3—Whitcomb 20 ton, gas locos., 36" ga. rebuilt.
1—Northwest Model 105 gas crane, caterpillar.
1—Lot of columns, arms and clamps, Ingersoll-Rand.
3—310' gas, portable, 1-R, air compressors.
2—Caterpillar tractors, No. 60, gas, with bulldozers.
1—Shovel-crane combination Lorraine, 1¼ yd. cap.
2—Locomotives, Plymouth, gas, 8 tons, 36" ga.
1—Locomotive, Vulcan, gas, 4½ tons, 36" ga.
25—Clamshell, tip over and skip buckets.

RICHARD P. WALSH CO.
30 Church St New York, N. Y.

GEORGE HAISS MFG. CO., Inc.

HAISS

Park Ave. & 143rd St. New York

Send me full details and prices on equipment checked:

FACTORY REBUILT CLAM SHELL BUCKETS

☐ 1—Haiss Rehandling 1½-yd. bucket
☐ 1—Blaw-Knox ¾-yd. Dreadnaught Bucket
☐ 1—Owen 2½-yd. Type "S" Bucket
☐ 1—Haiss 1-yd. HiPower Digging Bucket
☐ 1—Haiss 1-yd. Contractor Type Bucket
☐ 1—Hayward 1½-yd. Type "E" Bucket
☐ 1—Haiss ½-yd. HiPower Digging Bucket
☐ 1—Hayward 1¼-yd. Type "E" Bucket

Factory Rebuilt Truck Loader & Belt Conveyor

☐ 1—Haiss 2-yd. a min. Creeper Truck Loader
☐ 1—Haiss 1¼-yd. a min. Creeper Truck Loader
☐ 1—Haiss 25 ft. 16 in. Trough Conveyor, LeRoi, Gas.

Name .....
Address .....

(Classified Advertising Continued on Next Page)

Continued from Preceding Page

USED EQUIPMENT

GOOD USED EQUIPMENT

SELECTED SPECIAL ITEMS

1—No. 1260 Jeffrey Bakstad Jaw Crusher.
2—36"x54", 48"x72" Buchanan Jaw Crushers, all steel, Type C.
2—20" Superior McCully Gyratory Crushers, short head type.
1—42" Merrick Conveyor Weightometer.
1—8'8"x85' Ruggles-Coles Class A Rotary Dryer; also 2—5'x26'.
1—5-roll Raymond high-side Mill.
2—3-roll Raymond high-side Mills.
3—5'x50' Allis-Chalmers Rotary Dryers.
1—8'x125' Rotary Kiln.
5—6'6"x60' Vulcan Rotary Kilns.
1—3'x25' Bonnot Rotary Dryer-Kiln.
1—8'x12' Oliver Rotary Filter.
1—12' Gayco Air Classifier.
5—5'x22' Gates iron-lined Tube Mills.
1—7"x24" Sturtevant Jaw Crusher, to ½".
1—36"x36" Gruendler Hammer Mill, roller bearing, No. 4XC.
1—36"x24" Jeffrey Type D Hammer Mill.
1—7' Symons Cone Crusher.
2—20x14, 36x16 Sturtevant Crushing Rolls.
1—30x10 Colo. Iron Wks., Crushing Roll.
1—24"x72" Magnetic Pulley, complete.
6—Hardinge Ball Mills, 4½x16, 6x22, 6x36, 7x36, 8x22, 8x30.
1—3'x12' Hendy iron-lined Tube Mill.
2—6'x35' Louisville hot-air Rotary Dryers.
2—6'x45' Rotary Dryers—MONEL LINED.
8—3x5, 4x5, 4x7 Tyler Screens.
1—4'x8' Rotex, single deck.
1—305' 20" Conveyor, motor, reducer.
1—48" C/C enclosed Bucket Elevator, 14" buckets, 3/32" rubber covered 8-ply belt, with motor and reducer.
2—Shepard-Niles Traveling Cranes, 20-ton, 30' span—10-ton, 24' span, hand, chain operated.
1—16' Allis-Chalmers Log Washer.
1—25' Allis-Chalmers Log Washer.
8—6" Georgia Iron Works Dredge Pumps.

SEND FOR BULLETIN OF

our regular stock of Crushers; Vibrating Screens; Ball, Rod and Tube Mills; Air Compressors; Rotary Kilns and Dryers; Hardinge Ball and Pebble Mills; Raymond and other Pulverizers; Air Classifiers; Thickeners; Wet Classifiers; Filter Presses, Continuous Filters, etc.

CONSOLIDATED PRODUCTS COMPANY, INC.

15 - 16 - 17 Park Row, New York City

Shops and Yards at Newark, N. J. cover eight acres.

USED EQUIPMENT

FOR SALE—1 complete 10" Dredge Boat equipped with 40-foot Eagle Swintex Ladder and Amsco Heavy-Duty Pump.

Arkadelphia Sand & Gravel Co.
Arkadelphia **Ark.**

CARS

12-Yd. Western Air, also Hand Dump Cars, Flats, Gondolas, Steel Hopper Cars, Box Cars, Locomotives.

HYMAN-MICHAELS COMPANY
20 N. Wacker Dr. Bldg., Chicago, Ill.
Railway Exch. Bldg. **St. Louis, Mo.**
101 West 31st St. **New York**

SLACKLINE AND DRAG SCRAPER BARGAINS
1—½ yd. Slackline with 2 speed gasoline hoist.
1—¾ yd. Slackline with 2 speed Thomas hoist.
1—1½ yd. Drag Scraper outfit either gasoline or electric power.
1—2 yd. Drag Scraper outfit, either power.
Most all sizes of used buckets, hoists, wire rope, etc.
"Everything in slackline and drag scraper outfits"
S. O. NAFZIGER, 53 W. Jackson Blvd., Chicago

A RARE BARGAIN

Two—G. E. 125 H. P. Synchronous Motors, with Starting Equipment, Speed 900 R.P.M.—2200 Volt.

Funkhouser Equipment Company
2425 Jefferson Street
Kansas City—Missouri

FOR SALE

2 Complete Allis-Chalmers Pumping Units; each unit consisting of 2 10x8 S H pumps in series for 3000 GPM at 480' total head, 500 H.P., 2300-volt, slip ring, heavy-duty motors, and full control equipment.

Chillicothe Sand & Gravel Company
150 E. Broad Street **Columbus, Ohio**

New—RAILS—Relaying
ALL SECTIONS

Also contractors equipment, "V" shaped and Western cars, 24 and 36-in. gauge, portable track, gas locos, frogs and switches. Attractive prices quoted, wire for quotations.

M. K. FRANK
480 Lexington Ave. New York, N. Y.
Pittsburgh Pennsylvania

USED EQUIPMENT

5 Bucket-Chain Elevators, 24' to 45'.
4 Vibrating Screens.
10 Gasoline Engines, 6 to 79 H.P.
4 Telsmith and 2 Allen Sand Tanks.
Jeffrey No. 3 Jaw Crusher and Hammermill Limepulver.
Sauerman 1-yd. Crescent Power Scraper.
Dragline and Hoisting Engines.
Belt Conveyor Equipment, 16" to 26" wide.
1200 Ft. 18" to 20" Conveyor Belt.
G. A. Unverzagt, 15 Park Row, New York City

FOR SALE

22'x5' Bonnot Tube Mill complete.
2—35'x5'9" direct-heat dryers with furnaces and stacks.
No. 1½ Sturtevant fine crusher.
Nos. 3, 7 and 8 Gyratory crushers.
Conveyors, cars and draglines.
Box 446 Sheffield, Ala.

SPECIALS FOR THIS MONTH

300 H.P. GE slipring motor 25/3/2200/375
150 H.P. Allis-Chalmers slipring motor 25/3/2200/500
125 H.P. Allis-Chalmers slipring motor 25/3/440/1500
300 H.P. GE slipring motor 25/3/440/500
75 H.P. GE slipring motor 25/3/440/750
50 H.P. Wagner slipring motor 25/3/440/750
Complete stock 60-cycle motors and transformers.
ERIE ELECTRIC MOTOR REPAIR CO., Inc.
126 Church St. **Buffalo, N. Y.**

HOLLOW BORED DRILL STEEL
⅞" Hex.—Crucible and Swedish.

10 Tons in Bars, Approx. 20 feet long.
7 Tons made up in Drills—16" - 17" long.
Originally purchased for a large P.W.A. job, which the contractor was unable to complete because of financial difficulties.
SCHUPP & MANSFIELD
Ellicott Square **Buffalo, N. Y.**

HAMMERMILLS, PULVERIZERS, AND CRUSHERS

No. 4 Williams Hammermill. A-1, also miscellaneous other sizes.
Raymond Mill—5-roll, low side. Modern.
Hardinge Mills—4½'x16" to 10'x48".
Jaw Crushers—Msc. makes, 7x12 to 66x84.
Gyratory & Cones—6" to 40" and 2' to 7'.
JAMES WOOD, 53 West Jackson, Chicago

Take advantage of the Opportunity offered in the Used Equipment Department to dispose of the equipment that you no longer need.

ALL DOWN THE LINE—

Every last man in your plant can profit by reading ROCK PRODUCTS regularly. It will help him to bring new interest and new efficiency to his job.

Rock Products
With which is incorporated CEMENT-ENGINEERING NEWS Founded 1899
330 S. Wells St., Chicago, U.S.A.

See to it that ROCK PRODUCTS reaches you regularly—and pass it around! Subscriptions for the keymen would be mighty good investments.

We produce:

☐ Crushed Stone
☐ Sand & Gravel
☐ Glass Sand
☐ Lime
☐ Sand-Lime Brick
☐ Gypsum
☐ Phosphate
☐ Cement
☐ Slate
☐ Talc

Other Materials.....
We retail.....

Date....., 1935

Please enter my subscription to ROCK PRODUCTS for.....year.... (three years $5.00, one year $2.00—please state which. You save a dollar by subscribing for three years), for which we enclose $.....

Name.....

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Canada, $4.25. Foreign Subscriptions $4.00 a year

"E. C. A. REBUILT" QUARRY AND GRAVEL PLANT EQUIPMENT

AIR COMPRESSORS
Portable and stationary, belt, with elec. or gas. power, sizes from 21 cu. ft. to 1,000 cu. ft.

BUCKETS
246—Buckets, all sizes and makes.

CARS
Large lot including std. ga. 6 and 12-yd. and 20-yd., 36-ga. 5-yd. and 24-ga. 1½-yd. Also std. ga. flat cars and ballast cars.
48—Koppel Quarry cars 42" ga. 2½-yd. One way side dump.

CONVEYORS and ELEVATORS
9—Port Belt Conveyors with steel frame, gas. or elec. pr. 18 and 24 in. Barber-Greene and Chic. Automatic.
1—Stationary: Barber-Greene 18"x 100'.
11—Bucket elevators: 6 Chain Belt Co. and Weller and Link Belt vertical enclosed type; capacities from 35 to 117 tons per hour.
5—Weller inclined type Nos. 3, 4, 5 and 6 up to 170 yds. per hr.

CRANES (Locomotive)
5—Locomotive cranes; sta. ga. 30 and 25-tons; Ohio, Browning, American, Industrial.
1—American 15-ton gasoline powered locomotive crane on 8 wh. MCB trucks, 50 ft. boom. Model 158-G.

HOISTS
Gasoline, electric and steam. All sizes.

CRANES & DRAGLINES
1—Northwest Model 104 No. 1427, 45-ft. boom, 1½-yd. bucket.
2—Osgood Nos. 2054, 2069 with 40-ft. boom, 1 with 1-yd. shovel front.
1—Brownhoist No. 2 No. 9964, 40-ft. boom, 1-yd. bucket.
1—Link-Belt K-1 No. 1024, 50-ft. boom, 1-yd. bucket.
1—Industrial Brownhoist type CC, No. 5071, 36-ft. boom, ½-yd. bucket.

DERRICKS
Steel and wood, stiff leg, or guy; from 5 to 50 tons, including 3 steel stiff legs; 1—20-ton Terry 100 ft. boom; 1—10-ton Insley 80 ft. boom and 1—10-ton American, 80 ft. boom.

DRILLS & DRILL SHARPENERS
3—Gardner Denver wagon or derrick drills with Model 21 or 17 Gardner drills for channelling.
25—Ingersoll-Rand and Sullivan jackhammer column and tripod drills.

LOCOMOTIVES
32—Gasoline locomotives from 14-ton to 2-ton, std. 36 and 24-ga.
1—3-ton 42" ga. Fordson.
1—24-ton Porter steam, saddle tank, cyl. 12"x16" st. ga. Serial No. 5093.

PUMPS
All sizes and types, both force, centrifugal and steam.

SHOVELS
1—Osgood comb. heavy duty 1-yd. gas. shovel and crane, No. 2069.
1—Model "00" Thew crawler mounted gas. shovel with ½-yd. dipper.
1—Link Belt type K-25 ¾-yd. gas comb. shovel and crane; shop No. 1521; 60-ft. crane boom; 23 ft. shovel boom.
1—Industrial Brownhoist type DC 1⅛-yd. Diesel combination shovel and crane; shop No. 5176.

CRUSHERS AND SCREENS

1—Symons coarse cone crusher, size No. 5½, SU No. 521; capacity 450 tons per hour of 2½" material—130 tons per hour of ½" material; weight, 85,000 lbs.
1—Set Power and Mining Machinery Co. crushing rolls, size 42 in. x 16 in., rated capacity 15-20 tons per hour of ⅝" material; weight, 41,000 lbs.
1—No. 6 Champion jaw crusher, No. U-1075-4; jaw opening 12"x 26"; capacity 24-35 tons per hour of 2" material; weight, 20,000 lbs. Like new.
2—No. 3 McCulley gyratory crushers; size of each opening 7" x 28"; capacity 25 tons per hour of 2¾" material; 11 tons per hour of 1¼" material; weight 17,000 lbs.

SCREENS
2—Allis Chalmers roller type, all steel, heavy duty, 48 in. dia. by 24 ft. long screen in 3 sections.
2—P. & M. Roller type, 48 in. by 18 ft. long.
1—Allis Chalmers, roller type 51" dia. by 21 ft. long.

Equipment Corporation of America

PHILADELPHIA
P. O. Box 5419, Kingsessing Sta.
Phone Granite 7600

CHICAGO
1119 S. Washtenaw Ave.
Phone Nevada 2400

PITTSBURGH
P. O. Box 933
Phone Federal 2000

RAILS

For track. In stock near you

800 tons 100 lb. A. R. A.—A
400 tons 90s—600 tons 80s—150 tons 70s and lighter weights—both new and relayers, splice bars, tie plates, frogs, switches, etc.

QUALITY SERVICE PRICE

Write, wire or telephone inquiries to

E. C. SHERWOOD
7 Dey St., New York Established 1911

USED EQUIPMENT WANTED

WANTED TO PURCHASE
New or good second-hand Transit Mix Truck (2-yard preferred)
OR
Truck with agitator.
Address Box 689, care of Rock Products, 330 South Wells Street, Chicago, Illinois.

BUSINESS OPPORTUNITIES

AGENTS WANTED
All Over the United States
LIVE MEN TO HANDLE
THE
FASTEST SELLING
REDUCTION CRUSHER
IN THE WORLD

For Particulars Address
Box 690, care of Rock Products
330 South Wells Street, Chicago, Ill.

CONSULTING ENGINEERS

H. J. BROWN
CONSULTING ENGINEER
35 Doane Street, Boston, Massachusetts
Specializing in Gypsum Plants and in the Mining, Quarrying and Manufacture of Gypsum Products.
Consultation Design
Examinations Construction
Reports Supervision

WE LOOK INTO THE EARTH
By using Diamond Core Drills We drill for Limestone, Gypsum, Talc, Fire Clay, Coal and all other minerals.
PENNSYLVANIA DRILLING CO.
Drilling Contractors
Pittsburgh, Pa.

H. D. RUHM
Consulting Engineer
Dealer in PHOSPHATE LANDS and all grades of rock.
10-mesh PHOSPHATE FILLER, $3.00 net ton
40 years' experience TENNESSEE PHOSPHATE FIELD. Correspondence solicited. Can find what you want if it can be found.
305 West Seventh St., Columbia, Tennessee

BUSINESS OPPORTUNITIES

WANTED—Lime sales agency. Serving New Jersey, Eastern Pennsylvania and Delaware. Have good market for high-grade low Magnesia Lime for steel-making use. Please address Box No. 691, care of Rock Products, 330 South Wells Street, Chicago, Ill.

POSITIONS WANTED

LIME PLANT SUPERINTENDENT—DESIRES a permanent connection; 15 years' experience in operating lime plants, limestone quarries and crushing plants. Also have years' experience in the burning of lime in vertical and rotary kilns, and combustion problems of rotary kilns and vertical kilns. Efficient and successful handling of labor. Excellent reference. Address Box 688, care of Rock Products, 330 South Wells Street, Chicago.

POSITION WANTED AS SUPT. WITH A progressive stone company; 20 years' experience operating limestone quarries and crushing plants; familiar with all modern equipment, efficient handling of labor and low cost of production; qualified to assume full charge of any size plant; unquestionable reference. Address Box 654, care of Rock Products, 330 South Wells St., Chicago, Ill.

FIRST CLASS MAN with life experience in all kinds of quarrying, crushing and lime plants, honest, conscientious, desires position as manager or supt. Thoroughly capable of taking entire charge of any proposition. Moderate salary. Excellent references. Any location. Address Box 692, care of Rock Products, 330 South Wells St., Chicago, Ill.

NOW AVAILABLE—MY SERVICES, ON either temporary or permanent basis, as Technical Consultant on Lime—covering advertising, sales promotion, process development, technical service to customers, or other problems confronting the lime industry. Address Sidney P. Armsby, 209 W. 11th St., Rolla, Mo.

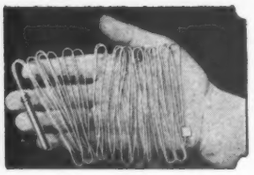
ENGINEER OFFERS SHORT TIME CONsulting service on gravel-pit and quarry reports—geology, plant design, and in particular, the commercial value of plant for any given location. Wide general experience and a very special experience in plant design for difficult cleaning and recovery operations. Roy Reddie, Consulting Engineer, Knoxville, Tennessee.

POSITION WANTED BY CHEMIST WITH 15 years' experience as Superintendent and Chief Chemist of cement plants. Capable of handling plant labor and all departments efficiently. Will accept position in either capacity. Excellent reference. Address Box 693, care of Rock Products, 330 South Wells St., Chicago, Ill.

High Calcium Deposit For Sale

Sell outright, or will negotiate with financier (principals only) for development of Rotary Kiln Lime and Dry Ice Manufacturing Plant on—10,000,000 tons high-calcium, high-grade Chemical Limestone deposit, Pennsylvania, in established field on Railroad. Preliminary estimates of cost of erection of Pebble Lime and Dry Ice Plant $900,000.00. Plus working capital. Estimated profits $1,000.00 per day. Products capable meeting strictest specifications in Chemical and refrigeration markets.

MARTIN J. O'BRIEN
211 Fairview Ave. BUTLER, PA.



Handy to carry. Easy to open. Wires folded accordion-wise, and supported by the tube, enclose and cushion the detonator. When tube is removed wires extend naturally into position. Permits priming without disturbing the rest of the Accordion Fold.

Accepted!

The use of Atlas Electric Blasting Caps in the Handy Accordion Fold is standard practice. Such nation-wide acceptance was readily predicted by those who first saw this new package development in 1933.

Its advantages, in safety and convenience, were so obvious that standardization was merely a matter of time. And—as has been proven—a very short time!

The acceptance of Atlas Accordion Fold Electric Blasting Caps demonstrates the fact that blasters are always receptive to new ideas of sound, practical value.

If you have overlooked this important Atlas "First" ask the Atlas Representative to show it to you. To see it is to accept it!

ATLAS POWDER COMPANY, WILMINGTON, DEL.

Cable Address—Atpowco

Everything for Blasting

OFFICES

Allentown, Pa.	Joplin, Mo.	New Orleans, La.	Pittsburgh, Pa.	Spokane, Wash.
Boston, Mass.	Kansas City, Mo.	New York, N. Y.	Portland, Oregon	St. Louis, Mo.
Butte, Mont.	Knoxville, Tenn.	Philadelphia, Pa.	Salt Lake City, Utah	Tamaqua, Pa.
Denver, Colo.	Los Angeles, Calif.	Picher, Okla.	San Francisco, Calif.	Wilkes-Barre, Pa.
Houghton, Mich.	Memphis, Tenn.	Pittsburg, Kansas	Seattle, Wash.	

ATLAS

EXPLOSIVES